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ANNOUNCEMENT.

We find it desirable to state that the company owning the ENGINEERING AND MINING JOURNAL has not purchased, and will not purchase, the *Pacific Coast Miner*, with which publication intimate relations have been maintained for the past four months. The ENGINEERING AND MINING JOURNAL is in a particular sense the organ of the mining and metallurgical professions of America, and while we wish well to all those who are doing good work in their respective fields of activity, it is found inexpedient to form an alliance with any local paper anywhere.

⚒

THE FIRST cargoes of Lake Superior iron ore have reached the lower lake ports, and navigation is now fully open. The greater part of the traffic is still held up by the firemen's strike, however, and very few vessels are moving, though many are ready to start. Under these circumstances, all the advantages of the early opening of navigation will be lost, and a great movement of ore will be necessarily concentrated into the later months of the season.

⚒

IT HAS BEEN suggested that the recent decision of the United States Court in the Northern Securities merger case would affect the leases and contracts, under which the United States Steel Corporation holds its iron ore lands on the Mesabi and Vermilion ranges in Minnesota, and the railroads connecting them with the Lake Superior ports. A comparison of these contracts, however, does not seem to support such a belief. It may be said that they have been so carefully made and so held that they are not open to attack under the decision. This is also the opinion of the Attorney-General of Minnesota, who has been making some examination into the matter. He is unable to find that the State has any grounds upon which it can interfere with the consolidation in its present form.

⚒

THE OCCURRENCE of fatal accidents due to combustion within air-compressors is an important subject on which we desire further discussion. In previous issues of this JOURNAL Dr. Ledoux has recounted an unfortunate occurrence of this kind and that well-known authority on compressed air, Mr. W. L. Saunders, has made some practical suggestions. We trust others will take the matter up. It seems clear that no single stage air-compression should proceed beyond 60 or 65 lb. Beyond that point the compression should be effected by multiple stage. At a mine of average size it is common to carry the compression to 90 or 100 lb. by single stage compressors. In such cases it is imperative that at least an intercooler be provided, and in every instance it is well to emphasize the necessity of using an oil of good quality for lubrication. It is also a frequent failing to have the intake within the engine room; while in small mines it is not uncommon to have that engine room in open communication with the boiler room, thereby introducing warm and coal-laden air into the receiver. These are matters of the greatest practical importance because they cause not only a loss of efficiency but something not to be measured in physical units, that is, human life. Therefore, they warrant the attention of mining engineers.

⚒

THE REPORT of the United States Steel Corporation is given on another page in such an analytical form that it hardly requires extended comment here. In one respect it deserves high commendation. The company has shown a disposition to give its stockholders and the public full information as to its operations, with such details that its position can be clearly understood. This is in such marked contrast with the policy of some other combinations, that it ought to be appreciated and approved.

The report shows that the company now makes approximately two-thirds of the output of finished iron and steel of this country. It controls probably even a greater proportion of the raw material—iron ore—from which that product comes. It has had an extremely prosperous year, and has taken advantage of it to accumulate a great working capital, and to lay aside a large surplus for necessary improvements, thus indicating the adoption of a very prudent policy. It must be remembered, however, that the entire period, which has passed since the company was organized, has been one of unprecedented prosperity and activity in the iron trade. Never before has demand been so great, prices so well maintained, or collections so readily made. During this period the company has paid only the moderate dividend of 4 per cent on its common stock, while the undivided profits set aside for improvements and additions have amounted to about 6 per cent more. This seems too small a margin for a trade, which has shown such wide fluctuations in the past, and will doubtless show them again in the future. The amount of capitalization is the weak point, as may be realized hereafter.

THE BRITISH COLUMBIA MEETING OF THE INSTITUTE.

We learn from the Secretary of the American Institute of Mining Engineers that the meeting arranged for July next, in British Columbia, with an excursion to Alaska, has been suddenly rendered impracticable by the withdrawal, on the part of the Canadian and American railroads, of assurances previously given as to cars for the proposed journey. The Pullman Company can provide cars for one way, but cannot furnish the equipment for the return. The reason for this is the unprecedented demand for cars for the regular traffic. Applications and negotiations in every possible quarter have resulted in the conviction that it is impossible to secure even one special train for the journey to British Columbia and back.

This unexpected outcome is much to be regretted, for many engineers were looking forward to a visit to the picturesque and important mining regions of the Northwest and they can only balance the disappointment by the recognition of the fact that they are feeling the results of a national prosperity which is severely taxing the industrial machinery.

⚒

THE HUMOR OF STRIKES.

The happenings of a single week illustrate the amazing folly of certain features in the unrest of the present time.

Contractors at New Orleans refuse to build a church which has been designed by a Northern architect.

Trolley men at San Francisco demand that promotion shall be by seniority alone.

The United Brotherhood of Carpenters in New York calls for a strike to crush its rival, the Amalgamated Carpenters' Society. The principal agent of the former states that the latter is a foreign institution with only 2,700 members in this country, while the Brotherhood is an American institution with a membership of 145,000. Therefore, he adds, "There is only room for one carpenters' union, and that is ours. The fight will be carried outside of New York, and we will either wipe out the Amalgamated Society or swallow it up."

The railway men of Holland have struck against the State, that is, the Dutch people. The economies made on the railroads are for the public; the strike involves no question of oppression of any kind, and the trainmen are fighting against circumstances brought about under a condition of society which—as far as regards the railroads of Holland—is Socialism.

Next, the schoolboys exhibit the force of example. At Hoboken 400 boys strike because their Easter vacation is shortened. A 13-year-old orator is found addressing his comrades from the eminence of a flour barrel. Five thousand other boys threaten a sympathetic strike.

At Madison the boys went on strike because they were not granted half-day sessions at once. The 150 boys were joined later by 50 girls.

These are facts. They indicate the spirit of the times. They may be regarded as grotesque in their absurdity, but unfortunately the bathos of it all goes unheeded.

Our statesmen are too busy looking after their political fences; the presidential election looming in the near distance checks the timid leaders from the attempt to correct evils, lest they encounter the enmity of the many headed one who votes, and by that ability to vote exercises a power for which political economy has made no adequate allowance.

⚒

STEEL PRODUCTION OF THE UNITED STATES.

The American Iron and Steel Association has completed its statistics of the production of open-hearth steel in the United States in 1902, and the detailed figures are given on another page. This enables us to give the complete statement of steel production for the year, estimating only the comparatively very small quantity of crucible and special steels made, which forms less than 1 per cent of the total.

The figures show that last year approximately 85 per cent of our output of pig iron was converted into steel. We may note also that our estimate of the steel production for the year—published in the Engineering and Mining Journal for January 3—was 15,100,000 tons, an extremely close approximation to the actual figures now given.

The total production of steel in this country for two years past is shown in the following table, in long tons:

	1901. Tons.	%	1902. Tons.	%		Changes. Tons.
Bessemer ...	8,713,302	64.7	9,306,471	61.6	I.	593,169
Open-hearth .	4,656,309	34.5	5,687,729	37.6	I.	1,031,420
Cru. & spe'l .	103,984	0.8	125,000	0.8	I.	21,016
Totals	13,473,595	100.0	15,119,200	100.0	I.	1,645,605

The increase in bessemer steel in 1902 was 6.8 per cent, while that in open-hearth steel was 22.2 per cent.; the increase in the total output of all kinds of steel was 12.2 per cent. In part, the small increase in bessemer steel was due to a local and temporary cause; but the gain in open-hearth steel was a substantial one, both in quantity and in proportion to the total.

The application of the different kinds of steel continued practically the same as heretofore. Rails continue to be made of bessemer steel almost exclusively, and it is also used for bars and merchant steel very largely; while the open-hearth steel is used for structural material, shapes and sheets. It may be noted, however, that the latest rail mill built—that at Ensley, in Alabama—uses basic open-hearth metal. That plant, however, made very few rails last year, having been completed near the close of the year.

It is worth noting also that the greater part of the additional output of open-hearth steel is from the basic furnaces. Of the steel made last year in the open-hearth furnace 79.1 per cent was basic and 20.9 per cent acid steel; the proportions in 1901 being 77.7 and 22.3 per cent, respectively. The bessemer, or converter, production continues to be practically all acid steel, and the basic converter does not come into use here. The proportions of acid and basic steel made are shown in the following table:

	Acid. Tons.	%	Basic. Tons.	%	Total. Tons.
Bessemer	9,306,471	61.6	.....	....	9,306,471
Open-hearth	1,191,196	7.9	4,496,533	29.7	5,687,729
Crucible	125,000	0.8	.....	....	125,000
Totals	10,622,667	70.3	4,496,533	29.7	15,119,200
Totals, 1901 .	9,854,602	73.1	3,618,993	26.9	13,473,595

The increase last year, as compared with 1901, in acid open-hearth steel was only 14.7 cent, while that in basic steel was 24.2 per cent. This increase will be augmented by the extension of steel making in the South, where several new plants are being erected and others are contemplated. All of these will naturally make basic steel.

The figures given emphasize the movement of several years past, and again show that the open-hearth process is growing in importance in this country. This is further shown by the fact that nearly all the new steel plants are open-hearth furnaces. The only important new bessemer plant now under construction is that of the Lackawanna Steel Company at Buffalo; and that is not wholly an addition to the converter capacity, since it takes the place of the smaller plant at Scranton, which the company dismantled last year.

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THE BUTTE REPORT.

In the present issue we give the first published results of the recent examination of the Butte District in Montana, by the United States Geological Survey. This report, to be issued shortly as a *Bulletin*, has been expected with much interest, and we do not doubt that Mr. W. H. Weed's work will be highly appreciated by the mining fraternity engaged in the development of the most important copper region on this continent.

The geological structure of the Butte District formed the subject of a report published by the Geological Survey, in the shape of a geologic folio, in 1897. The conclusions formed at that time have been largely modified, especially as to the extent and character of the faulting of veins, in consequence of the extremely active investigation of underground structure which was undertaken in the hunt for evidence to be used in the numerous lawsuits in which Mr. F. Augustus Heinze involved himself and his neighbors. Thus was Science helped by the most utilitarian form of commercial enterprise.

Litigation arising out of bad laws has been everywhere in this country a severe tax upon mining, and at Butte it has entailed the expenditure of enormous sums of money during the last five years. It is not, however, too much to say that in this particular case the cross-cuts and other underground workings carried out primarily to elucidate points of evidence in litigation, have led to the discovery of ore to an extent which has rendered the burden of the courts a comparatively light load, though no less an annoying one, prejudicial to business and hurtful to the commercial and political morality of the entire community.

The re-examination of the district, on which the present report is based, was begun in 1901, but owing to the fact that the investigations had to cover an area of underground workings aggregating a total length of several hundred miles, the field-work of the geologists was not finished until the autumn of last year.

It is apparent that the later examination has emphasized the great importance of faulting, in modifying the structure of the district and the distribution of the ore-bodies. Successive periods of fracturing have been followed by the precipitation of ore to such a degree that a study of profound and far-reaching interest has been offered to the investigator. The working out of the structural features has been difficult because the deposits occur in a homogeneous granite, the rock alone affording no clue to the amount or direction of displacement. However, the occurrence of intrusions of quartz-porphyry and aplite has afforded some guidance, so that Mr. Weed and his assistants have succeeded in deciphering many of the complexities which baffle the miner. The report is another of those publications which have contributed so much to the reputation and utility of our national geological department, and it

will doubtless find immediate practical application in the hands of mining engineers.

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MARKET CONDITIONS.

While the metal markets continue strong, some hesitation is apparent in certain directions, as is shown below. It may be said, however, that consumption remains very large and that there is no indication of any falling off in the immediate future.

The copper market is just now the weak point in the situation. Buyers have been induced by certain influences to believe in the possibility of a further fall in the metal, and are accordingly holding back, so that business this week has been very light and quotations are largely nominal. At the same time, producers of standard brands of the metal are not lowering their prices; they will not sell at any nominal decline, and, in fact, have little to sell. The situation is undoubtedly strong. There are no surplus stocks of the metal and most consumers are sold up well into next month. Spot copper is very scarce, and large lots for early delivery are not to be had. Sales at nominally low prices have been generally of inferior lots from second hands. The large sales made just before and during the recent rise have generally put manufacturers in possession of good stocks for present purposes, but, at the current rate of consumption, they will undoubtedly be on the market again before long. With regard to quotations of copper, some remarks will be found in another column. In London there has been a slight recovery of the market for standard, while best selected brands remained fairly steady. The depression, which was mainly due to misleading advices from this side, still continues to some extent, but will probably pass over before long. Demand for consumption in both England and Germany is improving.

Tin has been comparatively quiet with only moderate fluctuations in prices; buying for consumption continues at a fair rate.

Lead is unchanged in price, and a good business is being done at the present quotations, indicating that there is no falling off in consumption.

Spelter is also strong and sales to galvanizers and brass founders continue on a good scale. The Joplin ore market shows a somewhat improved condition as far as the deliveries of ore are concerned, but the smelters are still short of supplies, and prices of ore remain high.

Silver continues fairly firm with little change. The Philippine purchases will extend over several months and help to support the market. Some European buying for coinage purposes is reported from London, though the demand from India is stationary. Negotiations over the Chinese indemnity still continue, and it is now stated that the American position with regard to the payments, which is that they must be made at the rate at which the Chinese tael brought in gold at the time the treaty was signed, and not at current exchange, will be maintained by our Government. It is doubtful, however, whether the European powers will consent to this view of the treaty.

The iron and steel trades show little change in condition. Business remains good and transactions of considerable amounts are reported, although buyers are still holding back to some extent on contracts for the last quarter of the year. In the Southern market, iron buyers are insisting that the same concessions shall be made to them, as have been made to buyers on the Atlantic seaboard, but the furnace owners are not inclined to concede this point, which would mean a drop of $1 a ton from present rates, on all deliveries west of Pittsburg.

The Western coal market is still disturbed by the strike of the Lake firemen. Navigation is open, and there is nothing to prevent vessels from sailing from lower Lake ports, except the strike. A large number of ships are loaded, but only one or two small vessels have as yet left the Northwest. At local points supplies are generally good and trade is in better condition than it has been for some time past.

In the Atlantic seaboard trade there has been no important change in conditions during the week past. The demand is quiet. Contracts are still being closed and there is no particular market for speculative coal. Transportation from the mines to tidewater continues good, while car-supply at the mines, compared with what it has been been, is liberal, about 60 per cent. The coastwise vessel rates are firm and advancing owing to the more liberal arrivals at all-rail ports and the bad weather delaying vessels.

In the anthracite trade sales agents report orders received in excess of the possible output for this month. The demand is widespread and there is a heavy tonnage particularly wanted at the upper Lake ports. The labor troubles at the mines will probably be soon adjusted.

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THE NEW YORK METAL EXCHANGE AND PRICES.

An attempt is being made to reform the New York Metal Exchange and to alter its method of making quotations with the hope of increasing the usefulness of the institution. The new rules adopted as to quotations are given in our market column. It was high time that some change should be made. The Metal Exchange has heretofore occupied only an extremely limited field in the metal market of this city. The actual business in copper and in other metals has been done entirely outside of the Exchange, and the large dealers were only formally represented there. The quotations given in its daily reports have been based chiefly upon the bids of brokers and only occasionally upon actual transactions. The purchaser of copper for consumption has not gone to the Exchange, but as a rule to one or more of the well-known metal houses of the city, to do his buying.

So far as the local trade is concerned, while this condition of affairs is to be regretted, it has not had any serious effect. The conditions were well recognized and have not, to any extent, affected the actual trade. They have, however, done considerable injury in London, in Frankfort and other trade centers. The metal exchanges there are recognized authorities; large business is done through them, and their quotations form the record of the actual condition of the market. It is difficult for parties abroad to realize that the same condition does not exist here. The New York Metal Exchange is an imposing name, and when its quotations are telegraphed abroad, they receive attention and have an effect upon foreign transactions, being too often accepted as a fair representation of the business which is done here. Under these circumstances, it is certainly most desirable that if the Exchange is to be continued at all, it should not be the medium of misinformation, and should not send out to the world the bids or offers of irresponsible parties, which as frequently happens, do not represent the true condition of the actual market.

The new plan of the Exchange, as we understand it, is that prices should be sent to the secretary daily by the large selling houses in this city, and that the quotations made up by its officers should represent these prices, while bids and offers made on the Exchange should not be reported unless they represent actual sales and transfers of metal. How this will work remains to be seen; but it is very doubtful whether the usefulness of the Exchange can be increased. The New York public does not speculate in copper or in other metals at all, in the sense in which it is understood, or in the way in which it is done, in London. Practically no speculative accounts are carried, as they are on the London Exchange, and the daily movement of metals draws the attention only of actual buyers and sellers; while these, as we have said above, do not go to the Exchange to carry on their transactions. It is extremely doubtful whether any change in this custom can be established under existing conditions. Of course, it is desirable that any figures which are sent out to the world should not misrepresent the actual affairs of things, but it is a serious question whether the making of such figures at all is of any material use.

We should prefer to see the Exchange, if it is to exist at all, become a factor of use and importance in the metal market, but we confess that we do not clearly see how it is to be done unless there is a complete change in conditions. In the meantime, it is an important matter to impress upon those at a distance and especially upon European dealers, the small value of quotations heretofore given out as those of the Metal Exchange. We hope to present before long some analysis of the actual business done, which we think will confirm our estimate of the conditions as above given.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

The diameters of tanks, in cyanide practice on the Rand, are still expanding, but not the depths. The latest is 50-ft. steel vats, with an 8-ft. depth.

The Great Boulder Proprietary Mine, at Kalgoorlie, West Australia, is opening up a rich lode 6 to 10 ft. wide at the 1,600-ft. level. This is the deepest mining on telluride ores anywhere. In 1902 this mine produced 104,131 tons, which yielded $2,620,000 in gold, enabling the payment of $1,350,000 in dividends.

Details of metallurgical and chemical processes that have proved failures are often of as great interest to the student as the records of successes. They add to our knowledge of chemical reactions and eliminate useless lines of investigation.

"Standard" silver contains 925 parts of fine silver and 75 parts of copper, but the hardest alloy of these two metals contains 312½ parts of silver and 687½ parts of copper. Silver retains its whiteness, in spite of large admixtures of copper; in fact, it only begins to acquire a yellowish tinge when the proportions are 600 of silver and 400 of copper. Cheap silver jewelry is made in Birmingham, England, of various qualities of silver of less value than "standard," and articles of these qualities do not require hall-marking.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the Engineering and Mining Journal.

MINE SAMPLING.

To the Editor:

Sir.—I have read with much interest the articles and discussions on mine sampling appearing in your Journal. I agree with Mr. Courtis that specimen or grab samples, representing the different classes of ore in a mine are useful in sizing up the situation underground, and sometimes serve as a check on the other samples.

In sampling a vein where most of the values are in one or two streaks of friable ore and the remainder hard quartz, I have obtained good results by measuring and sampling the rich streak separately and figuring the average grade from the assays. This usually saves time in sampling, but requires another assay.

The information obtained is worth the cost of the extra assay, and to the mine operator it may save the cost of breaking down quartz too poor to pay, although the average across the vein, thanks to the pay streak, may indicate that all should be mined.

In a large vein there may be a streak next to a wall that will pay to mine, while the rest of the vein may be practically barren. A sample across such a vein would be wrong and might indicate that the vein was too low grade to work.

In figuring averages, values, etc., the engineer's slide rule is very useful.

Albion S. Howe.

San Francisco, April 3, 1903.

EUTECTIC OR AEOLIC.

To the Editor:

Sir.—Acting on Mr. Brough's suggestion, and with the advice of an eminent Greek scholar, I have decided to adopt the word "aeolic" to designate an alloy of lowest transformation point as distinguished from "eutectic" or an alloy of lowest melting point. The two naturally have very much in common; they belong to the same family. The distinction between the two, however, appears to be extremely important, and I do not think that we should be justified by any reasons of expediency in abandoning Guthrie's definition of eutectic. The essential quality of a eutectic, as he defined it, was that it was the alloy of lowest melting point. On general principles I do not think that we are justified in substituting for this essential and important quality of lowest melting point, the other and certainly important qualities of the eutectic. It is these latter qualities alone which the eutectic has in common with the aeolic.

There is no serious objection to broadening the meaning of "austenite" so as to include what was originally called martensite, and what I proposed to call "osmondite." Indeed, the recommendation of Messrs. Osmond and Sauveur, that this be done, seems to me an admirable one, and I have adopted this terminology.

I had understood that M. Osmond, the namer of austenite, objected to thus widening the term, but I see that I misunderstood him, so that, as he justly holds, there is really no strong reason for making a distinction between the solid solution for different carbon-contents; in other words, there is no need for a name in addition to austenite.

It is quite true that as M. Osmond says we use the word "square," speaking of public places, to include also circular and triangular places. To apply this, however, to the present case seems to me very misleading. A fair test in all such cases, I think, is this: Is the coexistence of different meanings for the same word liable to cause objectionable confusion? The following illustration will make this clear. We speak of "bow" in the sense of the front of a boat, also as a salutation as when I bow to a friend, also as a particular form of knot as a bowknot, also as an instrument for projecting arrows, also the act of playing with a violin-bow, etc. Now, these different senses cause no confusion, because they are so distinct that one knows instinctively which sense is meant. So in the case of aeolic which I propose: the fact that this word also has another established meaning is unimportant, because that meaning is not liable to be confused with the one which I propose.

Now, applying this to the word "square," there is no objection to having this cover circular and triangular public parks, because it is unimportant when speaking of one of these that your hearer should know whether it is a true square ,a circular, or a triangular park. But when we come to geometry the case is wholly different. If I were to say that every section of a sphere is a square or that every section of a triangular prism is a square, here using the word "square" in the sense of triangle or circle I should not be understood.

It is exactly so with "eutectic." I say to my students—the eutectic is the alloy of lowest melting point. Shortly after I say that the iron-carbon compound of lowest melting point is 4.3 per cent carbon. Soon after I say that eutectic steel contains 0.80 per cent carbon. Now, I happen to know, as a matter of fact, that this line of procedure does lead to confusion in the mind of students. I recognize this as a fact proved by my own experience, and on that account and very reluctantly I introduce a new word "aeolic." The truth is that if we regard the whole of iron-carbon compounds as a single series, and that is the point of view important to urge upon students, and if we desire to bring this series into relation with other eutectiferous series, it becomes extremely important that when we speak of the eutectic, we should be correctly understood, and that the students should not be left in doubt as to whether we refer to the alloy of lowest melting point or to that of the lowest transformation point.

The objection to specific names ending in "ite" I find extremely difficult to understand, and I think that it comes from a superficial view. We hear a great deal of adding thus to the terrors of metallography; but I never supposed that the fact that we say "quartz" instead of "hexagonal silica," or "pyrites," instead of "isometric iron bisulphide," or "methane" instead of "carbon. tetrahydride," or whatever it might be called, added terrors either to mineralogy or to chemistry. To drop such words as "alcohol," "ether," "phenol," "acetylene," "ethylene," "propyl," and hundreds of others from chemistry, and to substitute other words indicating the chemical composition of these various compounds, would be most unwise.

The truth is that the leaders of thought in any branch of science throw new intellectual burdens upon their fellows. Often somebody comes along and proposes a new word to help carry this new burden. He is then abused for increasing the labor of his fellows, but what they really ought to object to is not the conveyance which he furnishes them for carrying the new burden, but the fact that he is aiding in compelling them to carry that burden. My man has a trunk to carry. I provide him with a truck, and he may tell me that I am making him transport both trunk and truck, but if he has sense he does not say that I am increasing his labor. Among unthinking workmen I may receive a great deal of remonstrance on account of the fact that I introduce wheelbarrows, and compel the workmen to use them in place of trays. Now, it seems to me that this wholesale objection to specific names is of exactly the same order.

If we look at any branch of physical science, we see that wherever an entity becomes of such importance that it must be referred to often, then somebody proposes a specific name unless a convenient one already exists. In most branches of science this has become so familiar that no objection is raised, but in the new science of metallography many of our friends take a superficial view of the matter, and object to the wheelbarrow for carrying the loads offered.

A wheelbarrow should not be provided for carrying an umbrella, nor should specific names be proposed unless they are to accomplish some good. Each case then must stand on its merit. A sweeping objection to specific names as such seems to me simply unthinking. A man who has worked much in a particular field may find it necessary to use a specific name which to others will appear wholly unnecessary, for the simple reason that they have not felt the shoe pinch as he has. Therefore, while judgment and discretion should be used in proposing names, I would commend to some of our friends a considerable degree of toleration, for the proposition to create a new name may rest on good reasons which simply have not been made clear to them.

Henry M. Howe.

New York, April 1, 1903.

EUTECTIC, BENMUTIC, EUTREPTIC.

To the Editor:

Sir.—Mr. Bennett H. Brough (in your issue of February 28) speaks against the use of the word "benmutic." The word "eumetablatic" is objectionable on philological, the word "eualloiotic" on euphonetic grounds. The word "eutectic" should not have any other meaning than "fusible at a low melting point." To indicate the easy mutability, I propose the word "eutreptic" (εὔτρεπτον), and the word "dystreptic" could then be used for a more difficult mutability. If the metallographists then desire a third grade, they could use the word "hypereutreptic." Therefore, hypereutreptic, eutreptic, dystreptic.

E. Grohmann.

Serephos, Greece, March 22, 1903.

[This discussion is now closed.—Editor.]

THE GEOLOGIST IN MATTERS OF PRACTICAL MINING.

To the Editor:

Sir.—I have read with much interest Mr. J. E. Spurr's article, "The Geologist in Matters of Practical Mining." The moral appears to be, every man to his trade; but if mining geology is a study of the natural laws which govern ore deposits, then this study comes strictly within the province of the intelligent miner and mine foreman. Taking this class of men in a general way, as Mr. Spurr does, I cannot say that I have found them prone to catastrophic theories, any more than I could include a glacier as an active agent in catastrophic phenomena.

The hypothetical miner of Mr. Spurr, "starting to work in a new district," would be called by the class of men I am discussing, a "tenderfoot." The experienced miner in starting a prospect, seldom sinks outside the vein; in fact, he more often selects the richest place he can find, and then "stays with his ore," no matter how it dips or pitches. In drifting he pursues the same method. Such a miner sinks, when it becomes necessary, his working shaft, and cross-cuts to his vein; when he knows what he has, he drifts for that which he has seen, not "that which his geology has convinced him of."

It does not appear to me quite fair, for Mr. Spurr, after eliminating nine-tenths of the so-called geologists and miners from his review, to saddle the remaining 10 per cent of the latter with such fads as "the increase of ore in depth," as an abstract statement; or the sinking of a thousand-foot shaft to prepare, as it were, to cross-cut the vein in a supposed bonanza horizon. Such questions as these do not necessarily require the services of a skilled geologist; an every-day miner is sufficient.

As regards perhaps the majority of tunnel companies in the West, I am thoroughly in accord with Mr. Spurr, and have more than once called attention to these absurdities. Drainage tunnels, however, do not fall under this heading, inasmuch as they should always be figured on a commercial basis. For example, in a certain mining district pumping costs $500,000 per annum; the mines are good for 15 years; a drainage tunnel will cost $2,000,000, and can be completed in three years. The net result, exclusive of interest on the investment,

would be $4,000,000 in favor of the drainage tunnel. The study of faults is, to my mind, peculiarly the province of the miners. These men have not only classified and described faults and slips in mineral veins, but have also laid down rules to find the direction of the displacements.

Mr. Spurr, if I understand him correctly, believes one of the popular mistakes of the miner is to attach too much importance to "the kind of rock." From a miner's point of view this is difficult to understand, as he invariably looks at the enclosing rock as having a distinct influence on his vein; not that the rocks themselves are necessarily mineral bearing, but he knows from years of patient observation, that a change of wall rock too often means a change of the mineral contents of his vein. Mr. Spurr disclaims any attempt on behalf of the professional geologist, to classify formations as mineral bearing or the reverse. This being so, the miner may well ask, of what use is the professional geologist in matters of *practical* mining? To this question I at least am compelled to answer, however reluctantly, he is, under present conditions, of little, if any, practical utility. Every mining engineer should know enough geology to enable him to properly understand his own property and have a good working knowledge of the formation surrounding it.

It is a peculiar fact that geology has been built up and elaborated, and, I might almost say, raised to its present eminent position in the sciences, by men who were busy workers in other pursuits of life. Geikie, in "The Founders of Geology," after reviewing the bright stars of the galaxy, states: "Of the whole gallery of worthies that have passed before us there are only three that can strictly be considered as professional geologists, Werner, Sedgwick and Logan. . . . From the beginning of its career geology has owed its foundation and its advance to no select and privileged class of experts. It has been open to all who cared to undergo the trial which its successful prosecution demands. And what it has been in the past it remains to-day."

Mining engineers and expert miners do not claim as a class to be geological experts; yet they have taken no small part in the advancement of economic geology, and in the study and classification of ore-deposits. This was to be expected of them. They have not only undergone "the trials which its successful prosecution demands," but have also known something of the disappointments and sorrows of non-success.

If the professional geologist has advanced knowledge by reason of his experience, superior reasoning powers, or intuition, one might expect some tangible results in the way of great discoveries. The Colorado miner and prospector can point to Leadville, the San Juan, Cripple Creek, and other epoch-making discoveries made with the aid of such geology and observation as they had; what does the professional geologist in matters of practical mining offer us in contrast?

It may be said that the geologist must follow the miner, so that when a given district is opened up, or more often worked out, the former can explain how it happened that ore was deposited in that particular district, why it was limited to a certain horizon, and how wasteful and foolish the miners were in sinking perhaps a few trial shafts in search of a deeper horizon of pay ore. The expert geologist then proceeds to write up the theory of the ore-deposits. He will probably give us microscopical and chemical analyses of the ores and rocks, and lastly, determine with the utmost nicety the correct names of the various rocks in the complex, to the end that the mining profession may apply this knowledge to, say, some newer district.

There are, perhaps, no two mining districts strictly comparable. Mostly they are quite unlike. Compare Leadville, for example, with the Santa Eulalia district. Both are large producers of oxidized ores, lead carbonates; both deposits are in limestone, and there the comparison ends. The Gilpin County veins differ much from those in the adjoining county, and both from the San Juan vein system. Cripple Creek is incomparable, and so on.

No matter how able such a report may be, it must, from the very nature of things, be virtually worthless for *practical mining* purposes.

A geologist coming to a well-developed mining camp, or let us say to one that has passed the meridian of its glory, usually sees all the development work of the previous 10 or 20 years. The mistakes, the failures and the successes are all revealed to him, in a moment as it were; one man reviewing the work of hundreds. In such a case the geologist has, of course, the full right of criticism, he can, as a whole, commend or censure the work. To be just, however, he should endeavor to portray to himself the conditions that confronted those who conducted the earlier operations, before the exact nature or character of the deposits was known, then try and place himself in the position of those early workers, and reason out if, everything considered, even he could have done so well.

The miner naturally takes a more restricted view of his geological surroundings than the trained geologist. To the former an intimate knowledge of the geology of his own property, and those surrounding it, is of far more value than a general knowledge of the district, and such is usually ample for his requirements. The trained geologist, however, by working out the geology of a given area, accurately mapping out the formation and cross-sectioning the most interesting parts, can, from a theoretical point of view, be of much benefit to the miners, more particularly when this work is published and at their disposal early in the history of a mining district. In this way, at least, can the work of the trained geologist be made valuable to the miner. Thus each has his proper field, and can be of mutual assistance to the other; the one to describe and theorize in general, the other to test these theories by practical mining.

I am deeply interested in the geology of ore-deposits. I realize fully the theoretical value of the publications of the United States Geological Survey to the miners of the Rocky Mountain districts. Furthermore, I am anxious to see the usefulness of the survey increased, even at the expense of detail accuracy. This, in my humble opinion, can best be done by keeping the trained geologists abreast of the prospectors, so that maps and reports can be had early in the life of a mining district. It is true that in this method the geologists would not have the extensive data of an explored district to guide their conclusions, they would have to take some chances, and no doubt make occasional blunders. They would be less emphatic, more practical and perhaps not less generous in criticism, but better this, than their present vocation of writing what has been aptly described as "obituary notices" of the great mining districts of the West.

PHILIP ARGALL.

Denver, Colo., April 15, 1903.

VEIN-STRUCTURE IN COLORADO.

To the Editor:

Sir.—Assuming that the remarks of Mr. F. L. Ransome before the Geological Society, of Washington (JOURNAL, March 28, 1903, p. 477) were correctly reported, it is proper that some facts should be presented in connection therewith.

1st. Mr. Ransome's statement that my conclusions were fanciful, and the result of hasty generalization from incomplete data, was made in the face of the declaration in my paper of 1886, that the observations extended over an area of many thousands of square miles, the conclusions being published only after thirteen years of close study of the problems, and after seven years of intimate acquaintance with the region of the "Silverton Quadrangle."

2d. Mr. Ransome remarked that my views have no basis of fact, as he had himself already shown. His elaborate and valuable treatise on the "Geology of the Silverton Quadrangle," published by the United States Geological Survey, does not in any manner demonstrate this assertion, although the author dogmatically there indicates his opposition to some of my conclusions.

3d. The array of facts given in Mr. Ransome's own publication amplify and extend those previously published from my own observations, although it is significant that his list of minerals, given largely on the authority of others, would be very much diminished, if all those reported by myself to 1886 were excluded.

I have a deep and humble consciousness of the liability to err in dealing with such abstruse and little understood questions as bear upon ore-deposition. But I submit that one who gained such familiarity with the ores and veins of the San Juan region, as would necessarily follow from the sampling and laboratory study of thousands of tons from every locality over a period of several years, is entitled to claim that his work has not been that of "hasty generalization from incomplete data."

If there be such a thing as system in the arrangement of minerals in vein series, as many others besides myself believe, among them some who are belittled by the assumption that they follow my lead, the truth cannot be reached by dogmatic assertions. To myself, if my conclusions be awry, the greatest boon from a fellow-worker must always be the furnishing of the proofs of my error, but the judge in the controversy can never justly be one or other of the contestants. Let facts accumulate, but priest-craftry in science must not be tolerated for one moment. Even so very important a matter as the glorification and imperializing of our worthy National Geological Survey does not permit of wiping out all earnest, private effort by a stroke of the pen, or a hasty word in debate.

THEO. B. COMSTOCK.

Los Angeles, Cal., April 3, 1903.

WATER IN VEINS. A THEORY.

To the Editor:

Sir.—In the very able presentation of the facts concerning the presence in mining regions of ground-water at shallow depths it appears to me that the conclusions drawn are not warranted by the facts presented. The observations summarized show that ground-water is confined to a shallow depth, and it is emphatically stated that in the face of the facts "it is useless to talk of rock saturation to indefinite depths."

It follows from this that it is equally unreasonable to argue that any such general circulation as that outlined in curve and theory by Van Hise can have been an important factor in the filling of vein fissures. They should be trunk channels fed by multitudinous inpourings from the bottom and all parts of the fissure walls, according to the simplest expression of this theory. It seems, however, that the circulation in *pipes*, simple and attractive as it is, as outlined by Rickard, is also founded upon a false assumption, to wit, that open fractures filled by ground-water extend down to still hot rocks where the waters are heated, and leave these fractures to ascend in others, also open, that extend to the surface. It is only by the careful and prolonged study of existing hot springs that sufficient evidence can be accumulated to weigh this question properly. The German spas have long been studied, at Carlsbad particularly, and the inadequacy of the annual precipitation for the entire catchment area of the drainage basin in which they are situated, has been established by numerous observers. This fact is the more important as the ore-deposits of the Erzgebirge are correlated by many observers with these springs. Moreover, the heating of descending waters by deep-seated rocks presents great physical difficulties. To overcome these objections many writers have appealed to the assumption of capillary force, opposing the expansive force of steam from the hot rock. While not denying that the "pipe theory" may have its examples, it seems less theoretical and more in accord with actual examples to account for this heating by the steam and vapors known to be given off in enormous volumes by molten rocks, as shown by the igneous exhalations of living volcanoes, by

the emanations from lava streams, by the evidence afforded by contact metamorphic rocks, and by the difference in chemical composition in waters of plutonic origin, as compared with meteoric waters. But these facts all accord with Mr. Rickard's water zone, or ground-water theory, which must commend itself to the reader as worthy of further investigation. As Mr. Rickard himself says, let us have further facts.

Walter Harvey Weed.

Washington, April 7, 1903.

Mr. Weed's kindly comment on my suggestion affords me the opportunity of emphasizing the fact that in the employment of the household heating system as a simple simile to illustrate a general idea of the underground circulation, I do not at all wish to convey the notion of a similarity in the actual water-channels. It is the similitude of systems of circulation, and not a likeness between the pipes of the domestic apparatus and the water passages underground.

In presenting my view of the matter I said: "The physical condition of the rocks will affect the bottom of the water zone by determining the extent to which the accumulation of water can sink through the joints, cracks, clefts and crannies which are most numerous close to surface and decrease rapidly as it is left behind," and again, "A series of open pipes affords no parallel to the tortuous unequal fractures along which underground waters must, with an infinity of patience, find their way."

There is no doubt that all our conjectures regarding the character of the passages along which water finds its way at great depths, that is, in the approach to the horizon where vulcanism obtains, are hedged by one supreme limitation—the absence of direct evidence. However, Mr. Weed's own researches into the anatomy of thermal springs will suggest that there are definite passages which, while they are unlike pipes in their shape and origin, are yet like them in the service they perform. Therefore, I trust that the homely simile employed for purposes of exposition will not give so misleading a name as "the pipe theory" to the suggestion which I have offered. Let it be "the water zone theory," if you please, Mr. Weed. The other objections raised will be taken up after the publication of comment by other contributors.

T. A. Rickard.

April 9, 1903.

DR. THOS. DROWN ON EDUCATIONAL METHODS.*

The attempt to readjust our educational system in the interest of professional education meets with vigorous opposition from those who fear that it means the passing of the college, with all its good traditions and aims. I do not think their fears are likely to be realized. For a large number of those who intend to enter on professional life this shorter cut is necessary. But there will always remain a not insignificant remnant who, for love of study, will lay deep and broad the foundation of knowledge based on the humanities and on the physical sciences. The choice spirits whose lives are brightened with the finest products of ancient and modern thought and learning will always be with us to keep up the tradition of pure scholarship in our colleges and universities. And there will still be many who, having the time and means to take the lengthened course, will enter the professional schools after the full college course, and the professions will still be graced by men whose technical knowledge is based upon ripe learning and culture.

One more aspect of college and university life needs to be considered. The vital and essential part played by the lengthening of the period of infancy in the development of the human race, first pointed out by Mr. John Fiske, has been happily made use of by Dr. Nicholas Murray Butler in expounding the "Meaning of Education." But, it may fairly be asked, is the artificial prolongation of this period of irresponsibility, which wealth has made possible, accompanied by increased benefits to the race? Does it not rather result in enervating than in strengthening of power and purpose? It is a significant fact that the college graduate of the middle of the last century was about four years younger than the college graduate of to-day. Many of the great men of the nineteenth century, men whom it is our delight to honor as representing what is best and highest in private life and public service, were graduated at seventeen or eighteen years of age. Has there been a corresponding gain in maturity and in intellectual and moral force in the graduate of to-day to compensate for the additional years of study?

* From an address delivered at the dedication of the new buildings of the Central High School of Philadelphia, November 22, 1902.

RECENT TESTS FOR PLATINUM AND PALLADIUM IN THE ORES OF THE RAMBLER MINE.

By Wilbur C. Knight.

The discovery of the metals platinum and palladium in the copper ores of the Rambler Mine, 45 miles southwest of Laramie, Wyoming, aroused much interest when announced, a little over a year ago, in this Journal.[1] Since that time a great many tests have been made upon various samples taken from the mine, and I have not heard of an assay that did not show either platinum or palladium, usually both. Unfortunately the company selling this ore did not at first receive anything for these valuable contents. Last summer the New Rambler Company purchased the property, and they immediately commenced extensive development. This recent work has added greatly to the value of the property, according to the statements of those who are in a position to know. The smelting furnace operated by the old company is still running upon a mixture of oxidized and sulphide ores, and producing a very desirable grade of matte. The company experienced considerable difficulty in securing payment for the rare metals contained in the matte they produced, owing to the fact that none of the copper refiners were extracting them. On this account it was arranged that a refining test should be made upon five car-loads of matte, in order that the company might secure the entire contents in precious metals. A sample of this matte, assayed by Baker & Co., gave the following returns:

Matte sample from car No. 67,009.

	Original, oz. per ton.	Duplicate, oz. per ton.
Gold	0.45	0.40
Silver	7.40	7.46
Platinum	1.05	0.99
Palladium	3.15	3.25

In addition to this the same company reports an assay upon a car sample of ore, which is also interesting in this connection:

Ore sample from car No. 55,435.

	Original, oz. per ton.	Duplicate, oz. per ton.
Gold	0.16	0.19
Silver	3.80	4.72
Platinum	0.74	0.69
Palladium	1.80	1.90

It is worthy of note that the platinum values found in the ore at this time do not vary materially from the first tests announced. While other rare metals have been reported to be associated with the platinum and palladium, no one has as yet found out whether or not they are there in commercial quantities. Both osmium and iridium have been noted by competent chemists, and at the present time several are at work upon the slimes taken from the refinery, so that ere long much more will be known about the occurrence of these exceptionally rare elements in this interesting ore deposit.

[1] December 28, 1901, and May 17, 1902.

ALLOWANCES FOR INJURED MINERS IN BELGIUM.—The Belgian Miners' Federation has decided to petition the Government on the subject of compensation for workmen injured by accident. The Government scheme provides for an allowance of 50 per cent of the injured workman's wages. The miners ask that this shall be increased to 75 per cent. They also seek to obtain free medical attendance.

THE SAMPLING AND ESTIMATION OF ORE IN A MINE.—VIII.

By T. A. Rickard.

(*Continued from page 556.*)

THE FUTURE PROSPECTS OF A MINE.

There is room for the exercise of a wonderful lot of common sense in the judgment of a mine. Science, after all, is, as Huxley himself said, "organized common sense." If you have been walking along a road which has been straight and level for five miles you are unlikely to go wrong in supposing that it will continue straight and level for another half mile, even though the foliage prevents you from seeing more than a hundred yards ahead, but if you have proceeded along a road for a half mile or so only, it would be deemed foolish to predict that the road will maintain the same gradient and direction for five miles further. Thus, in estimating the persistence of an ore-body you may be justified in counting upon its continuity for another hundred feet if the ore has already persisted with some degree of uniformity for five or six hundred feet downward, and on the contrary, you will be playing with Providence if you assume the continuation for several hundred feet on the part of an ore-shoot which has as yet been traced for only 50 ft. from the surface. In this respect the mines of the Rand afford a striking contrast to most precious metal mines. The banket, in comparison with the ordinary type of gold-vein, has the persistence and uniformity of a coal-seam, and explorations on a large scale all over a very extensive region will warrant an engineer in making assumptions which would be ludicrous in California or Colorado. Yet, even under these exceptional conditions, such general evidence of continuity, when applied to an individual mine, must be amenable to the particular testimony obtainable in that particular mine or in the workings of its immediate neighbors. In most gold mining districts there is such an absence of uniformity in the structure and behavior of gold-bearing lodes that it becomes imperative to rely upon the particular testimony afforded by each mine. Such testimony, however, must be read in the broad light of experience. For this reason the estimates of ore likely to be opened up by further development will be more nearly correct on the Rand than similar calculations made by the same engineer elsewhere. Another distinction obtains; a precious metal mine in Colorado or California, by reason of mining laws which give the owner the right to follow the vein indefinitely in depth, has a future which is not confined to the narrow limits of mere acreage, such as is imposed in the Transvaal, in Australia, Mexico, etc. This renders the future of the American mine more speculative, while at the same time it lays upon the engineer the responsibility of appraising possibilities which are quite beyond the limits of ascertainable fact. It is no solution of the problem to say that such possibilities have no assessable value, for to adopt this attitude is to disregard the entire history of precious metal mining in the Great West, and the engineer who rests content with the evidence which is before his nose will prove but a disappointing, and often misleading, adviser to an enterprising client.

In arriving at general conclusions concerning the persistence of an ore-body in a mine, the engineer may have several guides, namely, the internal evidence afforded by the behavior of the ore-body in the ground which he has examined, the collateral suggestions afforded by the behavior of other ore-bodies in the same mine, the general evidence obtainable in other mines within the same region.

When the value of a mine centers upon one large ore-body, rather than several, there is no opportunity for inferences founded on similarities of behavior. The engineer is compelled to seek for internal evidence. If the sampling has been properly conducted and the results have been set down on the longitudinal section of the workings it will be found that the ore exhibits local variations from which certain deductions are possible. The relatively richer parts of the ore-body may be so distributed as to

indicate mere absence of uniformity, and nothing more, but, as a rule, the indications will go further and suggest either that the ore-body is becoming richer with increasing depth, or poorer in the same direction, or that there are successive zones of richer or poorer. Again, the lode may be as rich as heretofore, but a change may be apparent either by way of a shortening of the ore-shoot, or of a narrowing of the pay streak. For all these possibilities one has to search amid the tangled mass of evidence.

One or two instances will serve to illustrate such possibilities. In the San Juan region of Colorado the prevailing geological formation is a volcanic breccia, of Tertiary age, built up of fragments of andesite, which are arranged in nearly horizontal layers. The veins cut through this rock without, commonly, causing any very big dislocation. In these gold-bearing quartz veins there occur ore-shoots having a pitch which is usually not far from the vertical, and while such ore-shoots may be worked out in their entirety so as to exhibit an unbroken continuity in the stoping, nevertheless, to those who are observant of the variations in the grade of the ore, as recorded by daily assays or weekly mill returns, it is very clear that such variations coincide with the changes in the country, that is to say, the ore-body will be characterized by nearly horizontal bars of enrichment which are traceable to the effect produced upon the vein by the particular layer of breccia through which it is passing at a particular horizon. My observations lead me to suppose that the composition of certain layers of the fragmental volcanic rock is responsible for the effects noticed and that the layers which have the finer texture are those which are the most beneficial, for reasons outside of the present discussion. One example will suffice. In Fig. G it is seen that a series of adits penetrate a steep mountain which is entirely composed of andesite breccia. The lowermost adit goes through an average of 2½ ft. of 6 dwts. of gold, which is, in the district where the mine is situated, rather low-grade. The first portion of the level and the end of it pass through barren ground so that there is some evidence of the existence of an ore-shoot of this low-grade stuff. In the stopes there is no change to record until the next level overhead, No. 2, is approached. A raise connecting with this level passes through 8 dwt. ore. No. 2 adit makes a much better showing, and averages, fairly uniformly, 11 dwts. for an average width of 4 ft. Here also the level passes out of ore at a point nearly vertically over the corresponding impoverishment at No. 1. The stopes above No. 2 give, at first, results as good as the level, but in going upward they show a marked falling off, so as to average one-half the results given by the No. 2 level. At No. 3 the average of the level is only 3½ ft. of 4-dwt. ore, this is doubtless the reason why the level was not extended to the limit of the shoot. A raise put up from this level is in poor ground until within 50 ft. of No. 4; then marked improvement sets in. This is confirmed by the results from the No. 4 adit, which gives an average of 3 ft. of 10-dwt. ore. This good mill stuff, however, does not extend much above the level, as is proved by a raise, which gets into poor ground.

These data are perplexing and indicate an alternation of values which renders an estimate very hazardous. When, however, the geological structure is investigated there is found to be a relation, between values and structure, which illuminates the entire problem. In Fig. H there is given a section, on the plane of the vein, which exhibits the position of the series of layers through which the vein cuts. This helps to explain the results shown in Fig. G. The zones of enrichment penetrated by adits No. 1 and No. 4 coincide with two layers of close-textured tuff, or fine-grained breccia, laid down during the intermittent violence of volcanic eruption. The intermediate, overlying, and underlying beds of breccia are coarse, and, for some reason which does not concern the present inquiry, they are less favorable to ore-deposition than the occasional layers of tuff.

In this instance the evidence was very clear; in other mines situated in the same region it is not practicable, on account of the alteration in the enclosing country, to establish the relationship so clear-

FIG. G
SHOWING RESULTS OF SAMPLING

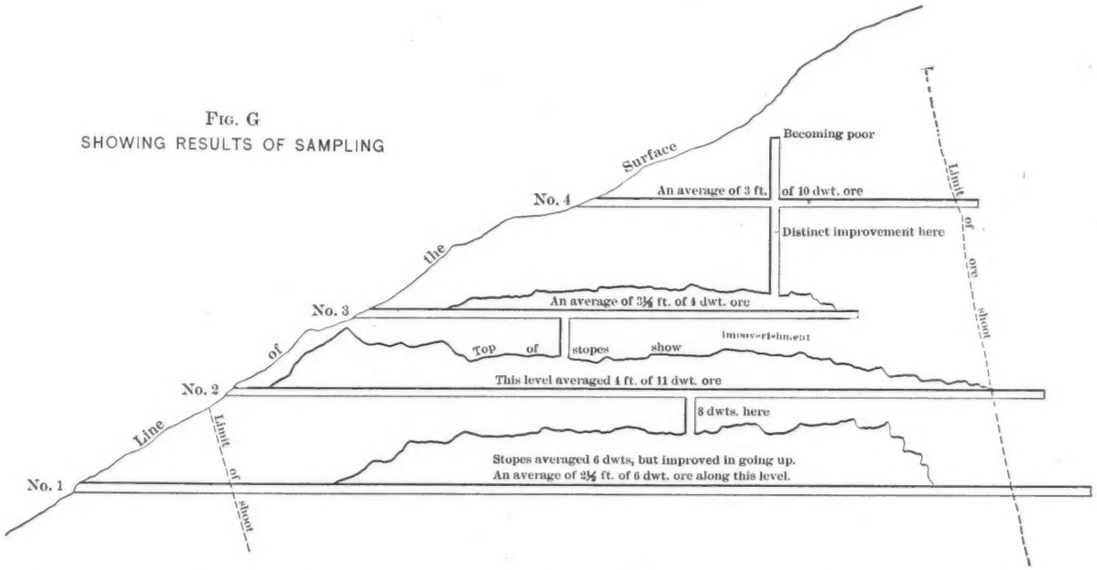
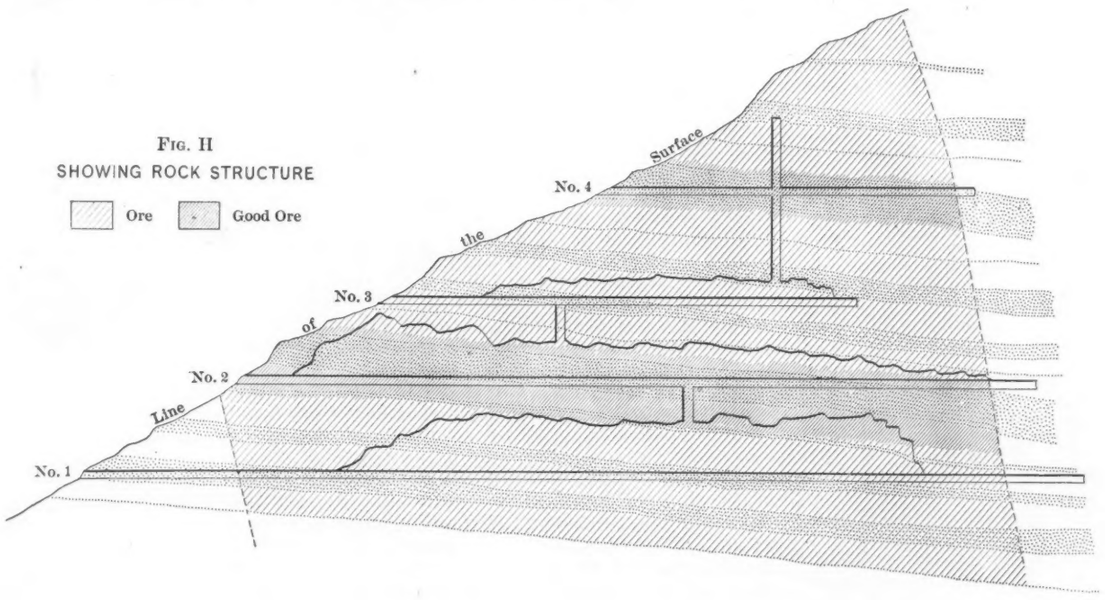


FIG. H
SHOWING ROCK STRUCTURE



ly, but it is a matter of experience that notable variation in both the width and value of the lodes does occur in a similar nearly horizontal direction. The understanding of it is, therefore, a clue to many apparent vagaries in the distribution of rich ore.

(To be Continued.)

ORE DEPOSITS AT BUTTE, MONTANA.*

By Walter Harvey Weed.

The report begins with a brief introduction and then proceeds to give an account of the geographical situation and the historic development of the Butte district. Next follows a description of the prevailing rocks—a dark basic granite, which is cut by dikes of a white aplite (often termed "granulite" by other writers). Besides these two rocks there is a later quarty-porphyry, which penetrates both the granitic varieties. The Butte district forms a part of an extensive region characterized by Tertiary igneous activity, and "the butte"—a hill of rhyolite to which the mining camp owed its name—is itself the eroded remnant of a small volcano.

The writer then proceeds to outline the main structural features.

The Butte Flat, a level valley bottom south of the city, contains no lake beds; it was formerly a normal erosion valley formed by the convergence of streams from east, west, and south of Butte, and was subsequently depressed by faulting along the base of the mountains east of Butte, which reversed its principal drainage and resulted in the filling of the valley by torrential débris and wash from the adjacent slopes. This faulting altered the ground-water level of the ore-bearing area and played an important part in concentrating the ores. The district is thus shown to be one of deep-seated igneous rocks, subjected to fracturing at various periods, the resulting fractures being in part filled by dikes, in part by veins, and in part displacing the veins; it is a region of continued and continuing crustal adjustment.

The veins occur in an area showing few outcrops, the rocks being altered by decomposition and disintegration and forming smooth slopes; only rarely do the granite boulders characteristic of the western part of the district show in the copper area. A few of the copper veins outcrop, but most of them, even the largest, are recognizable at the surface only by inconspicuous débris or do not show at all, a fact which has led to many lawsuits to determine ownership of ore bodies.

The multiplicity of fracturing is emphasized and the three distinct systems of veins are outlined by Mr. Weed.

The silver veins surround the copper lodes on the north, west and southwest. Their course and geologic relations are very similar to those of the copper veins, but their structure and mineralogic character are different. The silver veins contain complex sulphides of silver, blende, pyrite, and a little galena, and commonly contain no copper save near the border of the copper area, where, though occasional bunches of copper ore occur, it consists of chalcopyrite and more rarely still tetrahedrite, minerals which occur rarely and very sparingly in the copper lodes. The gangue consists of quartz with rhodonite and rhodochrosite, and shows marked banding and crustification, in strong contrast to the structure of the copper veins. These silver veins form very prominent outcrops, the quartz being stained black by manganese oxide. The veins are largely due to the filling of open fissures, and show but slight alteration of wall rock. They are displaced by and traversed by faults with friction breccias and alteration clays like those in the copper area.

Next, the minerals constituting the ores are discussed and the succession of sulphides is outlined. This portion and the remainder of the report is so interesting that we reproduce it in its entirety.

The ores contain about 2¼ cents gold to each pound of copper, with 0.0375 ounce of silver. Native gold has been found upon crystallized glance, but with this exception no gold or silver minerals are recognizable in the copper ores. It is estimated that the total production of copper ore has been about 31,000,000 tons, averaging 5 per cent copper. The amount of arsenic (and antimony) present is very large, it being estimated that over 32,000 lbs. a year pass off in smelter fumes. Tellurium is present in very small quantities in the ores, amounting to 2⅓ ozs., or 0.008 per cent, in the crude copper upon the converters. It is recovered in electrolytic refining.

Ore deposition.—Three distinct periods of ore deposition are recognizable in the deposits of Butte. As many of the ore bodies are of composite character and derive their contents in part from each one of these periods, a careful study is necessary to discriminate the evidence and results of each period. In general, it is necessary to differentiate primary deposits, of magmatic origin, mingled perhaps with predominating meteoric waters.

In general it may be stated that the original mineral-bearing solutions were probably hot and ascended through fractures in the granite. The copper deposits are almost entirely replacement deposits formed by waters ascending through mere cracks and attacking and replacing, particle by particle, the adjacent rock. The silver veins, on the contrary, are in large part due to the filling of open fissures, though replacement deposits also occur. In the replacement deposits there is a general lack of definition between country rock and ore, a wide zone of altered decomposed granite alongside of the vein, and commonly an impregnation of the rock between the individual veins of a lode with ore minerals. This is especially noticeable in the eastern part of the copper area, in the Leonard, Rarus, and adjacent mines. In the former an ore body is stoped out for 135 ft. in width,

ON THE 1600-LEVEL GAGNON MINE, BUTTE, MONTANA.*
Candle and candle-stick in center indicate the scale.

or those formed of material brought to and deposited in the veins from outside sources, and the so-called "secondary" deposits of transposed and redeposited material. The former constitute the normal vein filling, the latter both the bodies of rich ore that have made the district famous and masses of low-grade concentrating ores. As a general statement, it may be said that the deposits of copper glance are secondary.

The original source of the metallic contents of the primary deposits is still an unsolved question. It has been inferred by Mr. Emmons that, in the lack of direct evidence, "It is probable that circulating waters have somewhere in the depths extracted the metals from parts of the granite mass." To the writer the mineralogic evidence and the intimate connection between periods of ore deposition and igneous activity indicate a possible derivation from magmatic emanations—so-called mineralizing agents in waters partly consisting of altered granite, sheeted and intersected by a multitude of small veins crushed by later movements and impregnated by primary minerals, in part replaced by secondary glance.

In the central part of the copper area fresh unaltered granite is uncommon. There has been local development of intense thermal activity. The rocks are closely fissured as a result of several periods of fracturing, and the mineralizing solutions have penetrated and altered the rock between the fissures, converting and changing the rock to what is conveniently called pyritized granite, since the hornblende and mica are altered to pyrite.

The deep development work of many of the mines shows a decided change in the amount of mineralization of the fractures. There is an increasing number

* Abstract from *Bulletin* 213 of the United States Geological Survey, now in press. By permission of the Director.

* This photograph shows fragments of ore and granite torn from an older quartz-pyrite-copper glance vein by a later fault-vein.

of small veins of quartz and pyrite separated by altered granite. Some of the large lodes whose entire width is workable pass downward into a cluster of small veins of quartz and pyrite separated by altered granite. In other words, the replacement of intervein material by ore decreases with depth. There is also a decided increase in the number of small fissures devoid of ore and filled by friction breccia, but showing trifling displacement. This is particularly noticeable in the levels 1,600 ft. or more below the surface. On the other hand, some of the newer fault veins that show little or no ore in the upper levels contain pay ore, below, because the open nature of the fault material permitted a deeper seepage than usual of descending waters.

Poulin. Buffalo. Mountain Consolidated.

SYNDICATE GROUP OF MINES, BUTTE, MONTANA.

Secondary enrichment.—The enormous bodies of copper glance which have made the Butte district famous are probably the largest and best examples of secondary enrichment known. The fracturing of the veins has permitted the access of meteoric waters, which, dissolving the copper from the lean ores of the oxidized zone, deposit it, by reaction with pyrite, in the depths. These deposits were greatest in the upper level of the mines and have gradually lessened with depth. In some of the veins the lower limit of enrichment has been reached, in others the deepest workings still show these enrichments.

In general there is a marked association of faulting of the veins with bodies of rich ore, and these faulted areas are wet, so that the miners say: "A dry and tight vein is barren; a wet and crushed one is rich." This is particularly marked where the veins contain much pyrite, though the glance is more conspicuous in white quartz. In the deeper levels newly deposited quartz occurs with the glance. In the deepest levels, 2,000 ft. or more below the surface, rounded masses of glance 2 and 3 ft. across occur in crushed quartz containing relatively little pyrite.

Change of character of mineralization with depth.—The most notable change in mineralization with increasing depth is the greater abundance of enargite. In the eastern part of the copper area, in the Rarus Hill and its vicinity, this ore extends upward to the oxidized zone, sometimes very nearly to the surface. West of here there is a notable increase of enargite in depth, the mineral occurring for the first time in the very deep levels of some mines (i. e., 1,800 to 2,200 ft.), an association that also prevails in some of the later veins, such as the Blue, as well as in the older ones.

Influence of country rock.—There is a distinct association of the copper deposits with the quartz porphyry occurrence, since the most productive lodes occur in the area penetrated by this rock. The veins cross the porphyry, however, even the earliest ones, and hence the vein fractures are of later occurrence.

There is also a distinct genetic relation between ore and country rock, as a result of the deposition of the ore by metasomatic replacement. Thus the Anaconda ledge is low-grade where it crosses either the Bluebird granite or the Modoc porphyry, a feature explainable by the lack of easily replaceable, dark-colored ferromanganesian minerals in those rocks.

THE COPPER VEINS AND MINERALS.

Several of the copper veins were, as is well known, at first worked as silver veins. The upper portion of the veins consisted of quartz somewhat stained by iron, but not like the great iron gossan caps of other regions. This extends to a variable distance below the surface, 200 to 400 feet in some instances, where it is replaced by partly oxidized and decomposed copper ores that form the upper limit of the remarkable glance, enargite, and bornite ore bodies of the district. Carbonates and oxides are rare.

The copper minerals occur in quartz-pyrite veins of remarkable width and extent. The Anaconda ledge is frequently 100 feet wide and will average half that width, as will also the Syndicate lode.

The copper minerals of the Butte ores consist chiefly of chalcocite (copper glance), bornite (peacock copper), enargite (sulpharsenide of copper), and cupriferous pyrite. Covellite (cupric sulphide) occurred in considerable amount in one or two mines, but forms an insignificant percentage of the total output. Tetrahedrite (gray copper) and chalcopyrite (copper pyrite) are even rarer than the last-named mineral. Until 1900 copper glance constituted the most important ore mineral of the veins, but it is now nearly equaled in quantity by enargite. In the great ore bodies of the upper levels of the Anaconda veins glance occurred in masses of nearly pure lead-like mineral 20 ft. or more wide. In depth this mineral shows a more crystalline structure, and it is found in all the mines in greater or less abundance and purity, but in the great bulk of the ores it forms small grains scattered through the ores.

Bornite is less common than glance, and is practically restricted in occurrence to the veins in the western part of the copper area, where, however, it occurs in great abundance, forming the chief ore of the Original and Parrot mines.

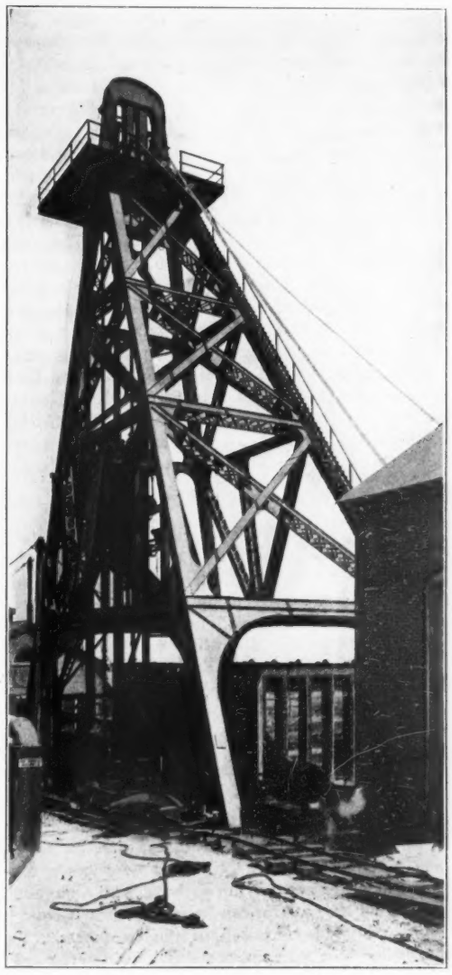
The gangue of all the veins is largely quartz, though there is also a large amount of altered granite with veinlets and bunches of ore. The vein walls are often defined by clay selvage, but these prove almost invariably to be due to post-mineral fracturing. More frequently there is a fading of ore into country rock, a feature characteristic of replacement deposits.

Character of the ores.—The copper ores average 55 per cent silica and 16 per cent iron. About 15 per cent of the tonnage mined is first-class ore, averaging 12 per cent copper; the remaining 85 per cent carries 4.8 per cent copper, and is treated in concentrating mills, the resulting product containing but 15 to 20 per cent of silica, while the copper is increased to 18 per cent.

THE VEIN SYSTEMS.

As a result of extensive legal development work the evidence is now conclusive that the east-west veins have been faulted. The identity of the Original-Parrot and Anaconda lodes is conclusively established, the displacement being due to the Blue vein. Farther east the Anaconda ledge is again thrown to the north by the Mountain View fault, the displaced segment forming the South ledge of the Mountain View mine, terminated eastward by the Rarus fault, throwing the lode southward so that its eastward extension appears in the Rarus Mine.

Earlier veins, east-west system.—The great veins of the district, the Anaconda, Parrot, Mountain View, West Colusa, Syndicate—in fact, all the great producers—belong to this east-west system, in which the trend is remarkably uniform, considering the length of the veins. The Silver Bow vein is a marked exception. There is some evidence to show that certain southeast fractures were mineralized in the earliest vein-forming period, and some of them reopened when the later faulting occurred.



HOIST AT HIGH ORE MINE, BUTTE.

These earlier east-west veins are distinguished as lodes or compound veins. They differ in structural

and mineral character from the later lodes, and, except where faulted and enriched, lack the high silver contents of the veins formed later. Fortunately they have been extensively fractured by strike faults, as well as the two other vein systems noted.

Northwest fault veins.—The northwest system of fractures faulted and displaced the east-west veins. The three largest veins of the system, the Blue vein, Mountain View vein, and Grey Rock vein, are mineralized, but not so generally as the older veins; the ore occurs in shoots and is quite high grade and shows enrichment. The Blue vein has been developed for over a mile, and to a depth of 1,000 feet, proving a heavy producer in several mines. It is cut and displaced by a northeast fracture in the Parrot workings.

Northeast fault veins.—The veins of both the east-west and the northwest systems are cut and displaced by those of the northeast system. The largest and best-known example of this is the Rarus fault, and the ownership of immensely valuable ore bodies has hinged upon the geological conditions in the Rarus and adjoining claims. A careful and prolonged examination of all the accessible workings of these mines, including stopes, has resulted in the establishment of the following facts:

The Rarus fault has cut and displaced all other veins. The cut-off is as sharp as if made by a knife, and high-grade ore abuts against fault breccia. The veins displaced are so close together that on certain levels the cut-off ends of different veins are opposite. The fault is compound, consisting of two fissures, the easterly with a dip of 45°, the westerly with a dip of 30°, and these fissures differ somewhat in strike. The interfault block is crushed and the included vein segments are broken and their orientation is disturbed by a tilting of the block. The actual fault fissures are marked by attrition clay containing rock and crystal fragments. When indurated by infiltrating solutions this resembles the quartz-porphyry. As the interfault material contains workable ore bodies, stoping is sometimes continuous from one vein across the fault to another. Whatever the legal construction may be, there is no geological continuity. There has been some ore deposited in the fault fissure, but not sufficient to form a new north-south vein along the fault, being confined to the proximity of older ore, upon and about which it was precipitated.

The Rarus fissure has now been developed to a depth of 1,600 feet and its existence established for a distance of 1¼ miles. Other fissures belonging to the Rarus system exist in many parts of the district, notably at the Original, Diamond and Leonard mines, in which extensive mineralization has taken place.

A GERMAN ELECTRICAL COMBINATION.—A Berlin dispatch says that the arrangements for the combination of the Allgemeine Elektrizitat and the Union Elektrizitat companies have been completed. Each concern will keep separate accounts, but will pool their profits, which will be apportioned according to the ratio of their respective capitals, the former company receiving fifteen-nineteenths and the latter four-nineteenths. The combination will become operative on July 1, and will continue for 35 years.

ALUMINUM-COPPER CONDUCTORS.—The *Electrical World and Engineer* says: "A patent issued March 24 to J. D. Nicholson describes a conductor having a copper core enclosed with aluminum. It is stated that a wire can be readily drawn from a compound ingot composed of the two metals, the core being of copper and the shell of aluminum. In coupling such wires the difficulty ordinarily found in soldering aluminum is not serious, as the copper part of the conductor can be readily soldered without raising the resistance of the joint. The claim is for a compound electrical conductor composed of a core and a shell of different materials drawn into wire, one metal being aluminum and the other copper.

A FURTHER DISCUSSION ON ORE DEPOSITS.

Specially Reported for the Engineering and Mining Journal.

(*Continued from page* 479.)

The discussion was continued by Prof. C. R. Van Hise. He believed that, in order to get a proper perspective and to appreciate differences of view, it would be well to first give a summary of points of agreement. Attention was called by the speaker to the fact that in his paper, published two years ago under the title of "Some Principles Controlling the Deposition of Ores," he had stated that the metals of some ores are directly derived from recent adjacent igneous rocks; that the ultimate source of all the metals of ore deposits is the igneous rocks; that igneous rocks have an influence upon ore deposits by contributing metals to them and by contributing solutions; they also produce important effects by heating solutions of meteoric origin and in forming the openings which may be followed by such solutions.

As a basis for discussion the following provisional genetic classification of metallic ore deposits was submitted:

- Metallic Ore Deposits.
  - Sedimentary.
    - (a) Chemical precipitates.
    - (b) Mechanical concentrates.
      - (1) Residuary deposits.
      - (2) Stream deposits.
      - (3) Beach deposits.
  - Igneous.
    - (a) Magmatic segregations.
  - Metamorphic.
    - (a) Deposited from gaseous solution.
    - (b) Deposited from aqueous solution.
      - (1) Ascending waters.
      - (2) Descending waters.
      - (3) Ascending and descending waters.

Referring to the most recent classifications of ore deposits, the placing of a large proportion of ore deposits as of pneumatolytic, fumarolic, solfataric, and pneumato-hydato-genetic origin, was deprecated. The question was asked as to the criteria by which ore deposits are known to be deposited by gaseous solutions.

The criterion which seemed to be of most weight to the speaker was the formation simultaneously with the ores of such heavy anhydrous minerals as garnet, pyroxene, wollastonite, tourmaline and biotite. For those ores which are deposited simultaneously with these minerals it is believed that they are deposited under the conditions of the deep-seated zone of rock flowage, and probably at temperatures above the critical temperature of water. It is further to be suggested that the frequent lack of definite boundaries for these ores and their dispersed distribution through rocks have a similar bearing.

If the question cannot yet be fully answered as to the criteria by which ores deposited by gaseous solutions are to be recognized, what shall be said as to the criteria by which such ores are divided into sub-classes? The placing of the various ore deposits of many well-known districts in such classes as fumarolic, solfataric, pneumatolytic, etc., without giving the evidence for such distribution, seemed to the speaker to be premature.

The criteria by which ores deposited by aqueous solutions may be discriminated were briefly summarized. The more important ones were held to be the following:

First.—The material which has filled the numerous openings of great sandstone, conglomerate, amygdaloid, and tuff formations, thus cementing them, is agreed by all to have been deposited by aqueous solutions. The evidence seems to be conclusive that the simultaneous filling of joint and fissure openings and the replacement of rocks by minerals like those of the cementation materials, are also the work of aqueous solutions. But here and there the fillings of various kinds carry a minute fraction of a per cent of gold and silver, or a small per cent of copper, lead or zinc, and are consequently ores. Such ores are almost certainly deposits from aqueous solutions.

Second.—The dominant gangue minerals which are deposited simultaneously with the great majority of ores, both in openings and in the wall rocks, are the hydrous silicates, such as the zeolites, the kaolinites, sericite and chlorite; the carbonates, such as calcite, dolomite and siderite; the oxides, such as quartz and hematite. These minerals are the same as those that do the general work of cementation. Moreover, they are the minerals which have been observed to be deposited by aqueous solutions at Steamboat Springs, Sulphur Bank, Boulder Hot Springs, Yellowstone Hot Springs and other localities. At some of these localities, notably at Steamboat Springs, Sulphur Bank and Boulder Hot Springs (described by Weed), small quantities of ores have also been deposited. Therefore, both observation of the actual work of aqueous solutions, and the fact that the minerals formed are like those which have done the general work of cementation, lead to the conclusion that ores having the above-mentioned gangue minerals as associates, are the deposits of aqueous solutions. No observations have been made which support the view that ores having such gangue minerals are deposited by gaseous solutions. But the ores having such gangue minerals are the dominant class, and *it follows that the class of ores deposited by aqueous solutions is of greater importance than any other class, and probably of greater importance than all other classes.*

Time does not suffice to discuss the sedimentary ores, nor more than allude to the igneous ores. In reference to the latter, it is well known that the corundum ores in certain corundum syenites are the direct products of magmatic segregation. Also, it is agreed by all that the titanic iron ores are produced by magmatic segregation. These ores, although large in total mass, are often low grade, and are at present of little or no economic importance. The important point in this connection is that aluminum and iron are the two most abundant metals of nature. The fundamental law of chemistry, the law of mass action, is here applicable. In order to produce a titanic iron ore containing 60 per cent metallic iron from a rock of medium basicity, such as a gabbro, it is necessary to suppose only that the iron has been multiplied seven or eight times beyond the original amount in the rock. It is therefore easy to understand why the processes of magmatic segregation produce such materials as titanic iron ore and aluminum ores. The production of ores other than of aluminum and iron by magmatic segregation is an entirely different matter. He who holds that ores of nickel, copper, gold, etc., are produced by magmatic segregation alone should determine the ratios between the amounts of these elements present in the original rocks and in the ores. When these ratios are determined one will be able to see whether or not the amount of segregation in these cases is comparable with that which we know to exist in the cases of the abundant elements where we can be sure of the nature of the processes.

Mr. Waldemar Lindgren replied as follows:

We all agree that the subject which has occupied our time during this meeting is one of great difficulty and complexity, as always must be the case with questions relating to processes which are going on in a region concerning which we have but little actual information—that is, below the surface of the earth. It seems to me, however, that the only way in which the question relating to the direct emanation of metallic substances from igneous magmas can be determined is by the study of the contact metamorphic deposits and the igneous rocks which have produced them. We have here metallic minerals deposited in such intimate intergrowth with contact metamorphic minerals that their simultaneous origin, in cases where no subsequent alteration has taken place, cannot for a moment be doubted.

There is only one point in connection with this that I would like especially to emphasize at this time: in the existing text-books on geology and petrography we frequently find it stated that during contact metamorphism the altered rocks have received no important addition of substance. From recent studies of contact metamorphism in the United States, the statement should probably be greatly modified. It may be true that in many cases there has been but little additional substance, and that the metamorphism has simply been effected by the molecular re-arrangement of minerals by the means of fluid or gaseous water. In other cases, however, the indications are plain that an enormous amount of material has been given off by the magma. It should be emphasized that the eruptive rocks that effect this metamorphism are almost exclusively those, of intrusive origin, which we know to have been solidified under considerable pressure and at a considerable depth below the earth's surface. During a recent examination of the Clifton copper mines in Arizona, where extensive contact metamorphism has taken place in the limestones adjoining an intrusive diorite porphyry, some interesting relations have been observed. At the contact with granite or quartzite, no alteration is observed. At the contact with limestones, however, garnet and epidote develop on a large scale, and are associated with pyrite and chalcopyrite. There is a total thickness of about 800 ft. of limestone. The lower part of the series is very siliceous, and the only pure carbonate of lime is found in some 50 ft. of the upper part of the series belonging to the lower Carboniferous. The most extensive and complete contact metamorphism has taken place in this stratum of pure limestone. It has, over a large area, been almost entirely converted to lime-iron garnet, associated with some epidote and a little copper sulphide. This action clearly implies an enormous transfer of silica and iron from the cooling porphyry to the limestone.

Evidence from several other points tends at present in the same direction. I consider it practically proved that under certain circumstances cooling magmas will give off quantities of various substances such as water, silica, iron, metallic sulphides, and, in small quantities, fluorine and boron compounds. Important results regarding the genesis of ore deposits will, I think, come from further study of these deposits. In many cases it will be impossible to prove the relative part which the meteoric and the igneous waters play in the formation of a given ore deposit, but I believe that, on the whole, the path for future advancement is laid in the direction indicated above.

The discussion was concluded by Mr. Weed, who said:

When the invitation to present a tentative genetic classification of ore deposits was accepted, the scheme was reduced to its barest outline, and then sent to Mr. Spurr and a large number of other friends, with a view to eliciting discussion. As a means of provoking discussion, it has been eminently successful, and it has drawn out two other schemes of classification. The fact should be emphasized, however, that my genetic classification expressly disregards commercial considerations; it is based upon scientific data, and is intended to express the processes of ore formation. There may be but one example, and that of little economic importance in a class, but it is genetically as worthy of recognition in the classification as the great productive deposits mentioned by Van Hise. In presenting this scheme, the first attempt at a strictly genetic grouping, the limitations of time prevented anything more than a very general statement of the principles upon which it is based. In the table, certain ore deposits were mentioned to show the nature of the deposits meant under certain types. Such references must be accepted as tentative, and as indicating that their character points to the origin predicated, to be confirmed or refuted by further study. For example, magnetic quartz veins have been recognized for many years. If, as Beck and Spurr maintain, these veins are sometimes gold-bearing, there should be a place for them in the classification. Beck[1] says, "The aplite dikes carrying the gold quartz veinlets mined at Berezovsk in the Ural Mountains, are genetically connected with the granite mass of Lake Shartash. . . . The perfectly fresh stone-hewer's chips of this rock, which is there quarried for stair steps, door jams, etc., are creditably stated to contain as much as one grain of gold per ton. If thus the intrusive stock proper is auriferous, it need not be wondered at that the subsequent outpourings from the same igneous hearth in the form of aplites, also brought with them a gold content which was concentrated in the quartz stringers. These quartz stringers have to be considered from the same point of view as regards their origin as the pegmatites."

Prof. Van Hise's concluding remarks indicate that the author of the proposed classification is expected to present detailed proof that each subdivision includes deposits of the origin indicated. This seems wholly unreasonable; for example, the igneous origin of certain copper and nickel deposits is maintained by Vogt, who has presented detailed descriptions of the deposits, and these descriptions and theory have been accepted by numerous geologists of repute and quoted in text books. It is not incumbent upon the author of a classification confessedly utilizing the work of all investigators, to present detailed proof of the correctness of the theories of well known men. Adverse criticism would be merited were such work ignored.

As regards the criticism of the igneous origin of copper and nickel ores, the fallacy of Prof. Van Hise's argument lies in an appeal to mass action while disregarding relative solubilities. Nor is it evident why "differentiation" of copper and nickel is a very different matter from that of differentiation of iron ore. The mere fact that there is more iron in a rock than there is copper, does not of itself and in disregard of solubility constitute a valid reason for the segregation of one and not of the other. Chalcopyrite and pyrrhotite are well known to be primary constituents of certain rocks, and the pyroxenite often carry 0.1 per cent more of nickel oxide, so that twenty times this amount would constitute ore, as occurs at Webster, N. C. At the same time it is recognized that there is not a copper deposit of demonstrated igneous origin yet known in this country.

Concerning the deposits made by igneous emanations, whose existence is so grudgingly admitted by two of my critics, the evidence of Aguilera, Kemp and Lindgren, is rapidly accumulating, and it is confidently believed that as observers become better acquainted with the character of these deposits they will be able to recognize them, and many other examples will be found in this country and in Mexico.

"An attractive air of precision," to use a phrase used in the recent discussion, is given to a citation by Mr. Ransome to the well-known California gold veins, as proof that because the veins cut the granodiorite that they must of necessity have no connection with this rock. I need only mention the classic tin-copper veins of Cornwall and Saxony, as well known examples controverting his contention. It is, however, well known to petrographers that there is frequently a close genetic relation between basic and siliceous dikes and the granite rocks cut by them. To argue that veins cutting granitic rocks cannot be closely related both genetically and chronologically to them, is as unreasonable as to assume that the dikes mentioned are always proof of a distinct period of igneous activity.

In reply to Prof. Van Hise it appears to me very evident that a failure to recognize criteria perfectly plain to other equally competent observers is not a proper subject for argument. I am content in company with Geikie, Fouque, Suess and Richard Beck, not to mention those who have supported me in this discussion. As Prof. Kemp has said, the scene shifters fill the stage in the "Principles controlling the deposition of ores." It is Hamlet, with Hamlet left out, and though the actors appear in the bill—the little classification presented to-night—they do not appear on the stage. Admitting as he does to-night that igneous emanations do form contact metamorphic ore deposits, it is certainly reasonable to believe that the emanations could and do mingle with ground-waters, to which they not only contribute metallic substances to be deposited as ores, but also chlorine, fluorine, boric acid, etc. These mineralizers add immensely to the solvent power of said waters, as a few drops of hydrochloric acid will sharpen the water in which calcite is dissolving, and such hot waters may add to their burden of precious metals by attack upon the rocks traversed. To quote the apt words of Suess, "The hot waters . . . accordingly cannot be anything else than the consequence of the degasification and cooling of a lava mass lying not far below the surface; emanations which are too feeble to cause a volcanic eruption or preparation for an eruption. It may be imagined that vadose infiltrations are carried up by the less hot springs, that is, that in descending, meteoric waters will meet hot water which prevents further penetration. One may even imagine that in the course of an oscillation of the internal heat, that is to say, in case of diminished rise of heated gases, as is now the case in the Yellowstone, the vadose water is enabled to penetrate into a somewhat greater depth, and with a renewed rise of the hot gases these deeper vadose waters may even be taken up by them and a certain mixture ensue, thus vadose additions may cause subordinate features masking the true condition. But the essence of the phenomena, just as in the case of volcanoes, consists in the uprising of juvenile (primitive) material, the 'internal' supply or contribution from the depth."

It is true that the views now held are slightly at variance with former ones, but an intimate acquaintance with, and study of, the hot springs of the Yellowstone during the past twenty years, and the accumulation of facts upon rainfall and flowage, have led me to a belief in the statement just given, and to the conclusions of Suess, that ore deposits are the work of hot springs, and that hot springs are a waning phase of volcanic activity. It is hoped at some future day to present a fuller account of the evidence for this classification. It has fulfilled its mission in provoking discussion, and it now remains for us all to gather new facts whose study will either prove or disprove the correctness of the classification here proposed.

[1] Richard Beck, "Lehre von. Erzlagerstatten," p. 324.

SLAG BRICK IN ENGLAND.—The London *Colliery Guardian* says: "The slag produced at the Coatham iron works is to be utilized for brickmaking purposes, the owners having made arrangements to start a plant at Middlesbrough very shortly."

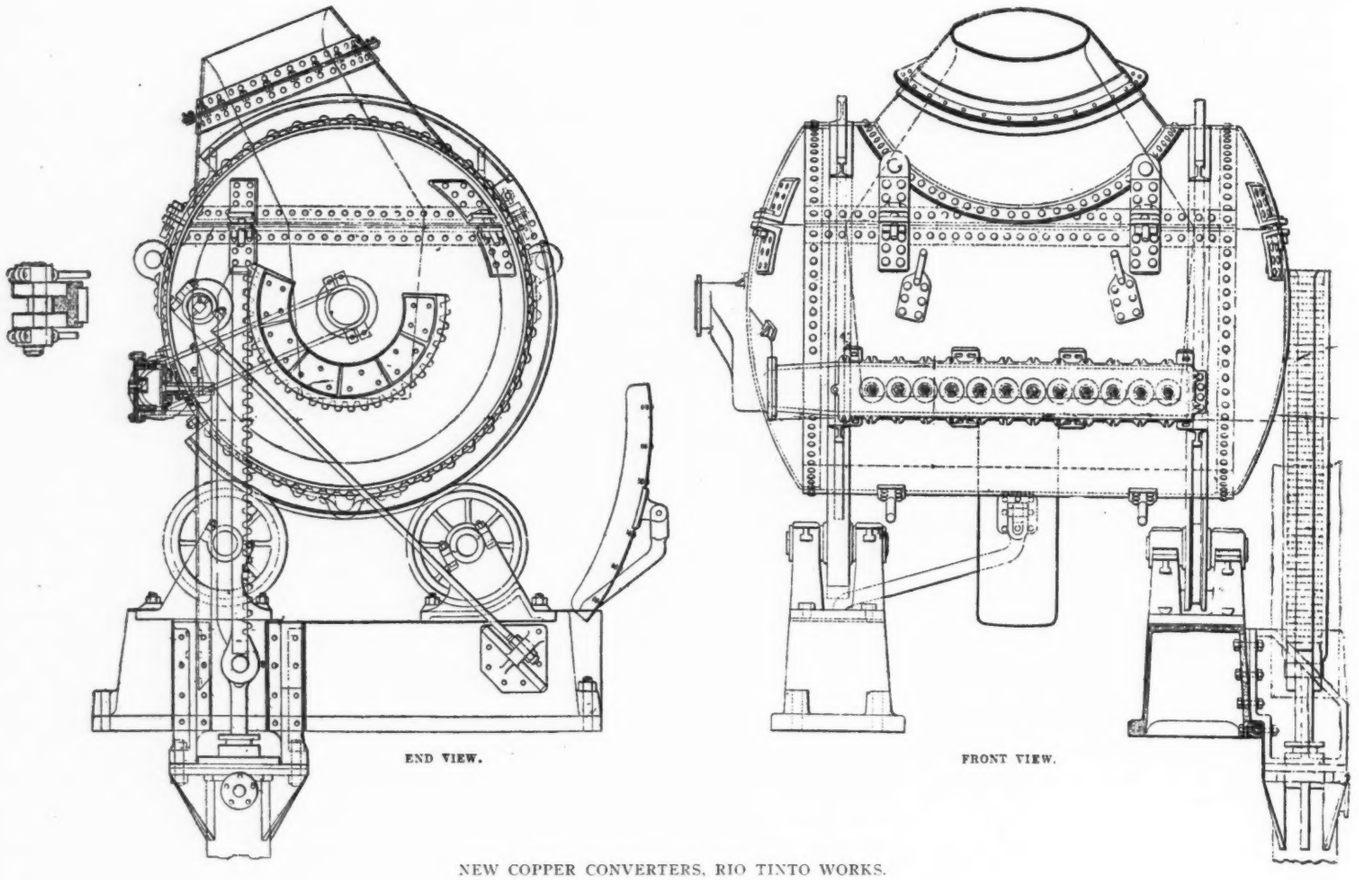
PIG IRON PRODUCTION IN GERMANY.—The German Iron & Steel Union reports the output of the blast furnaces in February at 734,259 metric tons of pig iron, against 782,484 tons in January, and 597,334 tons in February, 1902. Making allowance for the difference in the length of the months, the February output was on a somewhat greater scale than that for January, the average production per day being 26,224 tons in February, while in January it was 25,241 tons. For the two months ending February 28 the production was as follows:

	Tons.	%
Foundry iron	275,526	18.2
Forge iron	145,308	9.6
Bessemer pig	51,996	3.4
Thomas (basic) pig	906,619	59.8
Steel pig	137,294	9.0
Total	1,516,743	100.0

The total for the corresponding period in 1902 was 1,254,022 tons; showing an increase of 262,721 tons, or 20.9 per cent. The German Iron and Steel Association has adopted a new classification this year; instead of including special irons with forge iron, the new heading "steel pig" has been introduced, which includes spiegeleisen, ferro-manganese, ferro-silicon and all similar alloys.

THE NEW FURNACES AT THE RIO TINTO WORKS.*

Among the many improvements which have of late been introduced at the mines and works of the Rio Tinto Company, none are of a more interesting character than the up-to-date plant which has been erected for the smelting of the ores. In addition to the jacketted blast furnaces, the process of bessemerizing the copper mattes after their preliminary smelting has been adopted, and converters on a principle exactly similar to those used in the smelting of steel, have been erected. The process of bessemerizing mattes is not, of course, new, having been first used many years ago, although its general adoption has been a very slow matter. The plant at Rio Tinto is, however, one of the latest, and is believed to embrace the latest improvements. The annexed illustrations show views of both the blast furnaces and converters.



END VIEW. FRONT VIEW.

NEW COPPER CONVERTERS, RIO TINTO WORKS.

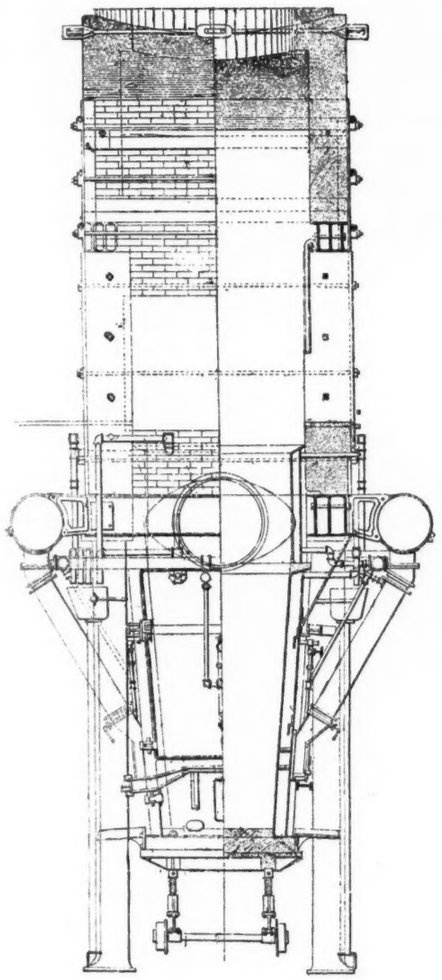
The blast furnace plant comprises two furnaces exactly similar to each other. The rectangular section at the tuyeres level is 13 ft. 4 ins. by 42 ins. The transverse section diminishes from 42 to 38½ ins. at the bottom and increases to 51 ins. at the upper part of the water jackets. The tuyeres are situated 28 ins. from the bottom, and the water jackets at a height of 8 ft. 4 ins. The total height of the furnace from the ground is 23 ft. 4 ins. In consequence of the charging doors being placed approximately 10 ft. from the bottom, the upper portion does not assist the smelting, though it increases somewhat the heat—even of these 10 ft. hardly more than 7 ft. can be considered to constitute the real smelting zone. The bottom of the furnace can be easily dismounted. It consists of plates lined internally, which are supported upon a framework on wheels, as shown in the drawing. There are eight water jackets, three on either side and one at each end. The six at the sides are each furnished with 10 tuyeres, each one of which rests on the bottom of the furnace, and they are suspended by means of an iron frame from the fixed columns, upon which rests also the upper portion of the furnace. In this manner the bottom, the water jackets, and the upper part of the furnace are rendered independent.

The charging is effected through two doors on either side, which occupy the whole side of the furnace, one on the right and the other on the left. Through these alternately ore and fuel are charged. They are both supplied with gas-tight doors. A blast pipe 20 ins. in diameter distributes the blast to the tuyeres. Another of smaller section conveys the water to the lower parts of the cooling jackets, from which it passes on to the upper parts and flows off through a sort of funnel into another pipe. Although this makes a break in the continuity of the cooling water pipes, it is adopted so that if one of the boxes becomes burned or overheated it may be detected by means of the steam produced thereby. The furnace has a sheet steel top, which is bent downwards at an acute angle so as to fit the flue. A single runner, which is constantly open, carries the molten matte to the forehearth. The latter is made of steel plates lined internally with brick, arched externally with a low arch of brickwork, and inside with congealed slag. It has a diameter of 12 ft., and it is 40 ins. in height. In front, towards the bottom, the taphole is situated. This is kept closed, except when a supply of matte is required for the converter. At the back, towards the top, is situated the outlet for the slag, upon which falls constantly a jet of water under considerable pressure, which granulates it, and carries it away outside the works. This is an idea borrowed from the United States, where the system was introduced in order to save the heavy cost of the transport of the slag, which, under the conditions ruling at Rio Tinto, would, to a very considerable degree, diminish the profit. The handling of the slag by manual labor was an operation which caused the larger portion of the accidents that occurred in smelting works. Each forehearth is capable of containing from 30 to 35 tons of matte.

The converters are of the cylindrical type, and during the blowing can be rotated on a fixed framework. The diameter of the converter is 6 ft. 10 ins., and its length about 15 ft. The tuyeres for the blast—of which there are 12—are provided with spherical valves to prevent an escape of the blast when the workman withdraws the spit, which he is constantly using to prevent their being stopped up. A piece of piping like the sector of the arc of a circle, which revolves upon a vertical axis fitted up at one of the front ends of the frame, can be lowered and put in a position to the right of the converter to keep it firm during the blowing. It can also be placed in front of the mouth when it is tipped for pouring into the moulds. In this case the sector serves as a guide pipe, and prevents any of the molten contents being projected outside. The tipping is effected by means of a rack, which meshes into a toothed section mounted on the converter. This rack terminates in a rod, which is connected to the piston of a hydraulic cylinder. The manipulation is effected at some distance from the two converters, there being a pulpit from which the operator has the whole of the apparatus in view, and can regulate the flow of the water to the hydraulic cylinders. When the lining requires renewing or repairing the cylindrical portion of the converter is lifted off with the aid of a crane, for which purpose it is furnished with four strong rings. Moreover, it is divided above the axis into two parts which can be fitted together with ease. In the top portion or cover the lining does not need to be replaced frequently, which is not the case with the lower portion, where it is rapidly worn away by the metallic bath. The converter is provided with a double lining; the external one of brick, which rarely requires to be repaired, is of a thickness of about 4 ins. Next comes the inner lining, composed of a mixture of silica and plastic clay. In the upper part it is about 22 ins., and in the lower about 26 ins. in thickness. It is evident that the more siliceous the lining the longer

* From the London *Iron and Coal Trades Review*.

it will last. This implies the utilization of a clay as plastic as possible in order to diminish its bulk. At Rio Tinto 90 per cent of silica is mixed with 10 per cent of clay, but if the latter is not sufficiently plastic in character, the result is an inferior lining which breaks away and lasts only a short time. The copper matte is carried to the converter in ladles, which are able to hold as much as 8 tons of material. However, this quantity can only be taken by a retort of which the lining has been worn away to a considerable extent. After re-lining the capacity is only from



NEW COPPER BLAST FURNACE, RIO TINTO WORKS.

3 to 4 tons. An electric crane is provided for the transport of the ladles full of matte, the tilting of them into the retort and the carriage of the converters to the workshop building.

OPERATING MOTORS IN DUST-LADEN ATMOSPHERES.—A patent granted March 31 to Thomas A. Edison describes means for operating electric motors in atmospheres which are heavily charged with dust, as in cement-grinding establishments, flour mills, etc. The invention consists in enclosing the entire motor in a casing consisting of a light framework covered with textile material, such as ordinary gunny cloth, the walls being double. Where the motor shaft passes through the casing a packed bearing is provided to exclude dust at that point. A fan is arranged within an opening in the casing to cause an outward draft from the same, a shield being so arranged at this opening as to prevent the inward flow of air around the fan, which would carry dust within the casing.

MINING METHODS AT JOHANNESBURG.

By T. Lane Carter.

The greatest expenditure of labor in the mines of the Rand is in getting the rock from the stopes to the cars at the level. The amount of work required to shovel a ton of rock from a stope into the cars depends upon the conditions obtaining in different mines. The outcrop gold mines, where the dip is as great as 70°, have a great advantage over the deep-level companies, where the stopes frequently flatten out to 25°. This flattening, taken with the broken foot-wall, makes it necessary to shovel, over and over again, every bit of rock, before it finally gets into the car.

In the deep-level mines, a good many incline-planes have been installed in the flat stopes, so as to facilitate the handling of the ore. The cars are loaded at any point in the stope, and are then lowered to the level below. They are then detached from the rope and pushed to the chute at the landing station, where the rock is dumped. The installation of an incline-plane is by no means as easy as the same undertaking would be in a coal mine. The road-bed has to be blasted out, and the whole contrivance must be protected against violent blasting. However, so much shoveling is saved by instituting these contrivances that it pays to put them in most stopes of 25°, in spite of the initial heavy cost. In these days of labor scarcity it is doubly imperative.

It may be of interest, seeing that so much has been said lately concerning labor conditions, to mention the methods of managing the workmen. Since the skilled white man receives so high a rate of wage, it is necessary to get as much work out of him as possible. Most of the work underground is done by the contract system, although a few of the leading mines operate entirely on "day's pay," and seem satisfied with their results. When the day's pay system is in vogue, the character of underground operations depends, to a large extent, on the mine captain and the shift bosses. If they are inferior or inactive men, the amount of loafing which goes on is surprising. If, however, a mine is fortunate enough to have a thoroughly capable mine captain, who has the gift of managing men, and the shift bosses under him are also alert, the day's pay system makes a very good showing.

The contract system, however, seems the better of the two. The company never appears to lose by it, although some of the miners receive nearly twice as big wages as they would at day's pay. One advantage arises from the fact that the mine employing the contract system attracts the best workmen, who realize that by this system they are thrown entirely on their own resources, with the chance of earning big wages, if they work both with their heads and their hands.

The modifications of the contract system are of practical importance. Some managers, for instance, employ it throughout the mine, except, of course, for timbermen, trackmen, pumpmen, etc. In such a case every piece of rock is broken by contract. Then there are mines using a combination of day's pay and the contract system, those, for instance, which are traversed by dikes and broken country, rendering it difficult to work the ground on contract.

There is, of course, a limit to the amount a contractor is allowed to make, and this limit varies in different mines, and at different periods in the history of the same mine. Before milling operations commence, for instance, when there is great eagerness to push the development in all directions as rapidly as possible, the contractor is allowed to make a handsome sum, month after month, without fear of a cut. On one big mine here, before the war, a thoroughly competent miner could make from $375 to $500 per month during the development stage, but when the mill commenced operations this fell a great deal, so that on this property $250 per month is now about the high-water mark.

Even after the mill starts crushing it is considered no more than fair that contractors in drifts and shafts should be paid higher than men engaged in stoping.

It requires considerable skill and experience to manage the contractors to the best advantage. The mine captain should be an expert judge of ground, and be careful to have the price neither too high nor too low. He must be just. The writer once worked with a contractor in a drive. It was noticed that for three weeks in the month he worked like a Trojan, but did very little in the latter part of the month. Upon being pressed for an explanation, it was found that he calculated he would be out if he worked strenuously all the month, so he took it easy after being sure he had done enough to get a good wage. In this case the price was evidently too high. Nor should the price be too low, for if too great a cut is made an efficient man is liable to leave for another mine, where he can make more money. One basis of calculation is that a contractor who works hard every day, and manages to drill 40 to 45 ft. a day, and to blast successfully all the holes, should be allowed to make about $250 per month. With such terms a man must work diligently. If he neglects his work, or is not intelligent about it, he runs the risk of being in debt at the end of the month. There are times, however, when the mine captain recommends that the pay of a contractor who has done poorly, be brought up to day's pay, and in such cases the man receives more than he has really earned. Discretion has to be used, for if the contractor thinks he is always sure of at least day's pay, he is apt to hang back with his work.

In stope contracts, the usual method is to pay so much per square fathom. I do not know of any mines here where the method of paying so much per ton broken is employed. In mines that are run on the contract system, much of the responsibility is taken from the shoulders of the mine captain, and put upon the survey department, which is responsible for the measuring of the ground. This is not the place to enter into a discussion of stope measuring, but I trust I shall be able to write a description of the methods used, at some future date. The prices paid for stoping vary, of course, in the different parts of the mine, and depend upon the character of the rock, whether the stope is underhand, or overhand. The biggest range I know of, in any one mine, is from $14.50 to $17.50 per square fathom. In other properties these prices differ, although there is probably not a stope in the district, at least in the deep level mines, that is being worked for less than $12.50 per square fathom. On the average $16 can be considered the prevailing price along the Rand, at the present time. Contractors are provided with Kaffir labor, for which they pay 75 cents per day per Kaffir. They are charged for the stores they use, such as dynamite, fuse, candles, etc., and at some properties they even pay for the sharpening of the drills.

What is a good month's work for a contractor? The number of square fathoms stoped out with two air drills(and it is almost the universal practice for each contractor to run two drills, except in the drifts) varies as much as the prices paid per square fathom. From 28 to 46 square fathoms gives an idea of the range. About 36 square fathoms, with two machines working a single shift, may be considered good work. The stopes average 4.75 ft. in width. In drifting there is considerable variation also. In some drifts a round of twelve 5½-ft. holes is made, while others require 16 holes. A man working with one machine in unfavorable ground, one shift per day, is doing good work if he makes 40 ft. per month. Under favorable conditions he may manage 50 ft. per month. The prices paid for drifting vary from $9 to $10.50 per foot.

Owing to the scarcity of cheap labor there are few stopes being worked by hand-drillers. It would be advantageous in most stopes to substitute drilling by hand for machines, and whenever it is possible, it is done. A white miner is given charge of a number of Kaffirs, 30 to 40, and works the stope on contract.

The contract system, which I have tried to describe, is certainly not the doctrine of trades-union-

ism, which preaches that every man doing the same class of work should receive the same wages per day. But there is a certain amount of trades-union feeling even among the contractors. It is generally understood that a day's work consists of putting in 4 holes, 5½ ft. deep, per machine. When the men are on contract they stick to this standard, and only in a few cases do they try to drill more than four holes for each machine. It has often been tried to persuade them to drill more, but they argue in the usual way, and do not change. What then is the advantage of using the contract system, if the men do not drill more holes than they would on the day's pay? In the first place, the men use their heads more. To see the care with which a successful contractor pitches his holes, so as to break the maximum amount of rock, makes one realize the difference between a contractor, and a wage miner. Then, too, the contractor is much more careful with his stores, dynamite, candles, etc., and waste is thus reduced to a minimum. And again, the contractor does not loaf. He attends strictly to business.

Many a manager has been surprised to find how early some of the contractors finish their drilling for the day. It is not an unfrequent occurrence to find a contractor, making good pay, finish drilling operations by 2.30 o'clock every day. Blasting is not allowed before 5 o'clock, and except the preparation of the charges, the contractor does nothing from 2.30 until blasting time. It is natural that a manager should try to devise a scheme whereby the company may get the advantage of these idle hours. At first the men were asked to drill an extra hole, whenever possible, the promise being given that the rate per square fathom stoped should not be reduced. They fought shy of the scheme, and preferred to make less, rather than overstep the bounds of the recognized day's work. Then the scheme was tried, and is still being tried on a small scale, of paying the contractors so much per foot drilled, in order that each man may drill the maximum number of feet per shift. By this arrangement the contractor is used as a driller. If the plan works well, no doubt regular blasters will be employed, the contractor having nothing to do with the blasting operations. This method of working contracts seems to have met with considerable success in other parts of the world. So far little success has attended it here. In the first place, by adopting this arrangement, the responsibility for the contracts is shifted from the survey department to the shift bosses, and this is undesirable. Then, again, the miners oppose the scheme as being an innovation. It looks as if in the future, as in the past, the general way of carrying on contracts on the Witwatersrand gold mines will be on the basis of area stoped out, without any reference to the amount of drilling, or the thickness of the stopes.

GOLD IN DIORITE.*

By Lewis B. Brown.

The melaphyres of the Altai, according to Tchihatchef,[1] appear to offer an analogy to those of Ararat. There is little doubt that these basic porphyries of the eastern Altai have been more or less in direct connection, as regards origin, with the gold-bearing veins which have recently been found there. In one instance, at the head of the Fedorovsky Creek, a tributary of the Byely Oos, native gold was found in the diorite, by Prof. Zaitzeff, of the University of Tomsk, in the summer of 1900. I examined this occurrence a few weeks later, and can vouch for its authenticity. No vein of quartz was to be seen within 500 ft. of this occurrence, and gold was apparently embedded in original particles in the diorite itself. There was, however, in the immediate vicinity an immense mass, either a dike or stock, of an exceedingly basic rock. This was evidently a peridotite having a somewhat porphyritic structure. At a distance of less than 1,000 ft. remarkable reefs of gold-bearing quartz have been uncovered, and have proved notably productive. Such an unusually well defined association of metallic gold-bearing veins with igneous rocks, from which the said veins seemed to have drawn their metallic contents, is worthy of careful attention. There is no case on record, as far as I know, of what appears to be so clearly defined a connection between gold and its immediate source. Tchihatchef calls attention to the theory that the presence of diorite is always favorable to the occurrence of gold, and gives numerous examples drawn not only from the Altai, but from the other parts of the world to support his hypothesis. It is possible that the lateral secretion theory has here a striking and immediate application.[2]

Masses of serpentine, evidently secondary after some of the more basic igneous rocks, may be observed on the right bank of the Chuya. They are intimately mixed with large masses of calcite, and the whole region is colored red by iron oxidation to such an extent as to have received the name of Krasneogora, or Red Mountain.

* Abstract from a paper presented to the American Institute of Mining Engineers, March, 1903.

[1] "Voyage dans l'Altai Orientale," by P. Tchihatchef, Paris, 1845.

[2] Compare the occurrences of gold in granite, noted by W. P. Blake, "California Minerals," 1864; G. P. Merrill, *American Journal of Science*, iv, p. 309, 1896; J. B. Jaquet, "Geology of the Broken Hill Lode," *Memoirs* Geological Society of New South Wales, Australia, No. 5, 1894; and Möricke, in Tschermak's *Min. und Petr. Mittheil*, iii, 1891.

THE UNIVERSITY OF TEXAS MINERAL SURVEY.

By William B. Phillips, Director.

The Legislature of Texas has increased the appropriation for the support of this Survey from $10,000 to $15,000 a year. There was practically no opposition to the continuation and enlargement of the work that was begun two years ago, and the field parties will be sent out at once. The geological survey of Texas, which was begun in 1888, was discontinued in 1892, and from this date until May, 1901, no public work of this character was carried on by the State. Two years ago the Legislature appropriated $10,000 a year for each of the two following years, and authorized the expenditure of the money by the Board of Regents of the University. During the last two years the following *Bulletins* have been prepared and issued:

No. 1, Texas Petroleum, July, 1901, 4,000 copies.

No. 2, Sulphur, Oil and Quicksilver in Trans-Pecos Texas, February, 1902, 3,000 copies.

No. 3, Coal, Lignite and Asphalt Rocks, May, 1902, 4,000 copies.

No. 4, The Quicksilver Deposits of Brewster County, October, 1902, 4,000 copies.

No. 5, The Minerals and Mineral Localities of Texas, January, 1903, 5,000 copies.

In addition, there was prepared and sent out separately a topographic map of the quicksilver district in Brewster County, 4,000 copies, so that the total number of copies of the publications of the Survey distributed is now 24,000. The demand for these publications has been so active that with the exception of No. 5 there are now no more on hand.

The co-operation of the United States Geological Survey has been of great importance to the Survey in the preparation of topographic maps of the asphalt area in Cooke and Montague counties, and of the quicksilver district in Brewster County. The Government topographers have also completed a survey of a 30-minute quadrangle lying in the southwestern part of Brewster County and the southeastern part of Presidio County, including the quicksilver district. This has now been sent to the engraver, and it is hoped that the map will be ready for distribution by the first of June. Work has been begun on the 30-minute quadrangle east of this area and comprising the Chisos Mountains and a portion of Tornillo Creek and the Carmen and San Francisco Mountains, all in the southern part of Brewster County. All of this work has been undertaken by the United States Geological Survey in co-operation with the local Survey, and it is expected that similar plans will be carried out during the next two years.

Among the plans which the University Survey will carry out during the next two years are:

1. The preparation and publication of a geological and mineral map of El Paso County, comprising an area of nearly 10,000 square miles, with the contiguous territory which will have to be considered. It is in this county that the most promising deposits of copper and lead ores occur, as also the tin deposits of the Franklin Mountains, north of the city of El Paso. The sulphur deposits south of the Delaware Creek also lie in this county and are thought to be of commercial importance. At the same time with the study of the economic geology of this region, which will be undertaken by the University Survey, there will be a study of the water question under plans of co-operation with the Hydrographic Bureau of the United States Survey. The public school fund of this State now owns more than 2,000,000 acres of land in El Paso County, much of it in undivided blocks, and it is the purpose of the Survey to examine as much of this land as possible.

2. A study of the clays and the clay industry of the State, including their geology, chemical composition and physical natures. There are large deposits of almost every variety of clay in the State and these have not been studied in detail.

3. The preparation of a special bulletin on the Coal Measures of the State, especially those of the Carboniferous. For the first few months after the discovery of the supplies of fuel-oil at Beaumont it was thought by some that there would soon be a practical annihilation of the industry of coal and lignite mining. For a time coal miners were inclined to take a pessimistic view of the situation, for with oil at 20c. a barrel there did not seem to be room for coal and lignite. This apprehension has to a large extent been removed with the increasing price of fuel-oil, so that now there is a resumption of activity among the producers of solid fuel. There are coal seams in the Carboniferous of Texas that have not yet been opened, as for instance, in Stephens County. The remoteness of these coals from rail has prevented the attention that might otherwise have been given to them. But the project of a railroad into these undeveloped districts has awakened new interest in them, and it is for the purpose of determining their commercial importance that the University Survey will undertake a critical examination of the entire area involved. It is held that some of the undeveloped area of the eastern part of the Carboniferous is likely to afford good coking coal, a much desired article not now found in the State, so far as known. It is not likely that there will be funds for other work than is here outlined, although it may be possible to prepare a bulletin on the Building and Ornamental Stones. The Survy has recently installed a power-driven Dwight petrotome for cutting and polishing stones, and it is now in daily operation.

A CONFERENCE ON EARTHQUAKES.—At the invitation of the German Government a conference with the object of founding an international seismic association will be held at Strasburg from July 24 to July 28.

FIXING COAL PRICES IN FRANCE.—A project of law has been introduced into the French Chambers, providing for the fixing of a retail price for coal sold in Paris. It is doubtful whether it will be passed; nevertheless it received a considerable support.

IMPORTS OF PRECIOUS STONES.—Imports of diamonds into the United States in February were valued as follows: Uncut, $1,143,101; cut, $1,042,803; total, $2,185,904; against $1,082,574 in February, 1902. Imports of other precious stones were valued at $152,225, against $139,633 last year.

THE UNITED STATES STEEL CORPORATION IN 1902.

The United States Steel Corporation has just published its annual report, covering the operations of the calendar year 1902. The figures—far exceeding in their amount those submitted by any corporation previously—give an idea of the extent of the operations of the company, and show that it controls approximately two-thirds of the output of the country in finished steel and iron products.

The balance sheet, summed up and reduced to its closest possible analysis, shows assets and liabilities as below:

Common stock	$508,302,500	
Preferred stock	510,281,100	
Stocks of subsidiary companies	215,914	
		$1,018,799,514
Bonds, U. S. Steel Corp.	$301,059,000	
Obligations of subsid. companies	69,285,878	
		370,344,878
Sinking and other special funds		29,698,993
Current accounts and liabilities		49,826,252
Surplus fund		77,874,597
Total liabilities		$1,546,544,234
Properties owned and improvements		$1,328,446,343
Sinking fund and miscellaneous		3,263,734
Inventories, material on hand		104,390,845
Accounts, bills and collectable assets		60,280,140
Cash on hand		50,163,172
Total assets		$1,546,544,234

To put it briefly, the company has, in capital stock, $1,018,799,514, on approximately half of which it has agreed to pay 7 per cent yearly, before the other half can receive anything; it has $370,344,878 in obligations constituting liens on part or all of its property; it has $29,698,993 in special funds intended to retire those liens or to replace property worn out or destroyed; while the remainder of $127,418,831 constitutes the working capital held in hand to carry on its enormous operations, without friction.

The production statements in the present report cover the calendar year; the first report was for the year ending March 31, 1901, so that any comparisons made would include a duplication of the figures for the first quarter of last year. We have, therefore, given the figures for this year 1902 by themselves, not making any comparisons. The iron ore mined by the Corporation from its mines in the Lake Superior region was as follows, in long tons:

	Tons.	%
Marquette Range	1,487,370	9.3
Menominee Range	2,675,754	16.7
Gogebic Range	2,064,492	12.8
Vermillion Range	2,057,537	12.8
Mesabi Range	7,778,026	48.4
Total	16,063,179	100.0

These shipments were 58.3 per cent of the total ore output of the Lake region last year. For the current year the proportion will be higher, as the Steel Corporation has acquired additional holdings.

The coke produced was 9,521,567 tons. The coal mined from the Corporation's mines, and not used in the production of coke, was 709,367 tons. This would make a total of approximately 15,000,000 tons mined by the company. This shows that the hold of the company upon the coal supply is much less extensive than that upon the output of iron ore. The company must have bought a large quantity of coal from outside parties last year. Of the coke, however, its works produced nearly 38 per cent of the total output of the country last year. It must be remembered, however, that nearly all of the coke last year came from the Connellsville District, which is a region now on the decline.

The production of steel ingots at the various works was as follows last year:

	Tons.	%
Bessemer steel	6,759,210	69.4
Open-hearth steel	2,984,708	30.6
Total	9,743,918	100.0

This total is 64.4 per cent of the total output of steel ingots in the United States last year. It shows that the Steel Corporation must have bought a large quantity of pig iron from outside interests.

The production of the Corporation's blast furnaces last year was: Pig iron, 7,802,812 tons; spiegeleisen, 128,265 tons; ferromanganese, 44,453 tons; total, 7,975,530 tons. This was 44.8 per cent of the total output of pig iron in the United States. The proportion—as with iron ore—will probably be greater this year, inview of the new furnaces completed, and those bought by the Corporation. If we take the spiegeleisen and ferromanganese separately, we find that the Corporation's output was 81.1 per cent of the total for the country.

The following table shows the total quantity of finished products made; in this table the item of billets and blooms shows only the quantity shipped and sold to others in that form, and does not include billets made and afterwards converted into other products in the company's mills. The figures are in long tons:

	Tons.	%
Billets and blooms sold and shipped	782,637	9.5
Rails	1,920,786	23.4
Merchant steel, bars, shapes, etc.	1,254,560	15.3
Plates	649,541	7.9
Sheets and tin-plates	783,576	9.6
Wire and wire products	1,122,809	13.7
Wire-rods	109,330	1.3
Tubes and pipes	744,062	9.1
Axles	136,787	1.7
Spikes, bolts, nuts, etc.	42,984	0.5
Rail-joints and angle-bars	139,954	1.7
Structural work (Am. Bridge Co.)	481,029	5.9
Miscellaneous	29,177	0.4
Total finished products	8,197,232	100.0

Only 9.5 per cent of the steel made was sold in the comparatively crude form of billets. The table shows the wide range of products made in the company's various mills.

The tonnage of unfilled orders on the books at the close of 1902 equaled 5,347,253 tons of all kinds of manufactured products. At the corresponding date in preceding year the orders booked equaled 4,497,749 tons. In many of the classes of heavier products, like rails, plates and structural material, practically the entire capacity of the mills is sold up until nearly the end of the year 1903.

The income account for the year—condensed as far as possible—may be given as follows:

Gross sales and earnings	$560,510,479
Rentals and miscellaneous	3,128,971
Int. on invest. & receipts from cos. controlled	5,426,452
Total receipts	$569,065,902
Manufacturing cost and operating expenses	$411,408,818
Selling, general and transportation expenses	13,202,399
Taxes, discounts and current interest	4,299,494
Rentals and interest, subsidiary companies	6,846,427
Total expenses	$435,757,138
Net earnings	$133,308,764
Depreciation and replacement funds, regular	$14,150,325
Depreciation and replacement funds, extraor.	10,000,000
Interest on U. S. Steel Corp. bonds	15,187,850
Sinking fund on Corp. and subsidiary bonds	3,664,064
Total charges	$43,002,239
Net balance for stock	$90,306,525
Dividends paid, 7%, on preferred stock	$35,720,178
Dividends paid, 4%, on common stock	20,332,690
Total dividends	$56,052,868
Undivided profits, to surplus	$34,253,657

Had all the net earnings shown been applied to dividends, they would have been sufficient to pay 10.74 per cent on the common stock. The sum available for dividends was 15.84 per cent of the gross receipts.

In this case it is impossible to make any close averages of production; it may be stated, however, that the gross sales and earnings showed approximately $68.37 per ton of finished steel product, and the total receipts $69.42 per ton. The manufacturing expenses were $50.19, and the total expenses $53.16 per ton.

The report says that "the actual expenditures for ordinary repairs and maintenance included in operating expenses were $21,230,218. It cannot be stated, however, that this specific sum was taken out of the net earnings for the year, because in the manufacturing and producing properties the expenses for repairs and maintenance enter into and form a part of production cost. And as the net earnings of such properties are stated on the basis of gross receipts for product shipped, less the production cost thereof, the income for the year is charged with outlays for repairs and maintenance only to the extent that the production during such period was actually shipped. But as the shipments in 1902 equaled practically the year's production, approximately the entire amount of the expenditures in question has been deducted before stating the net earnings as above."

The report says, in brief, that the physical condition of the properties has been fully maintained during the year, the cost of which has been charged to current operations. The amount expended during the year for maintenance, renewals and extraordinary replacements aggregated $29,157,011. Of this amount $7,926,793 was for extraordinary replacements, the bulk of the same ($6,978,230) being in connection with the manufacturing properties. The ordinary maintenance and repairs aggregated $21,230,218, of which $16,099,218 was spent on the manufacturing properties and $3,544,654 on the railroad properties; remainder scattering.

From the organization of the corporation, April 1, 1901, to January 1, 1903, the amount of bonds and mortgages paid and retired by all the companies, including bonds purchased for sinking fund, was $6,384,759; bonds and mortgages issued for new property acquired $3,456,660; net decrease, $2,928,099.

The unsecured obligations of the subsidiary companies, consisting of purchase money obligations, bills payable and special deposits, were reduced during the fiscal year 1902 by $13,652,368, and during the entire period from April 1, 1901, to December 31, 1902, by $24,700,339. The funds for said payment were provided entirely from the surplus net earnings; no new capital or bonded or other liability has been created in lieu thereof, although practically all of such payments might properly be funded, as the liabilities were those of the subsidiary companies prior to or at the time of organization of United States Steel Corporation for the acquirement of additional property or for moneys borrowed, which were in turn used for purchase of property and construction expenditures.

As shown by the balance sheet, the amount of these liabilities outstanding on December 31, 1902, is $17,377,468, as follows: Purchase money obligations, $6,689,419; bills payable, $6,202,502; special deposits, $4,485,547.

The expenditures made during the year by all the properties and charged to property account equaled, less credits for property sold, the total sum of $16,586,532. These outlays were made for the completion of construction work at manufacturing properties under way when the United States Steel Corporation was organized, also for necessary additions and extensions authorized since its organization, for the acquirement of additional ore and coal property, the opening and development of new mines and plants, for additional equipment and facilities demanded by the growing requirements of the business of the transportation properties, to secure material reduction in cost of manufacture, transportation of raw and unfinished material, and distribution of finished products, etc.

The outlays as above are classified by properties as follows: Acquirement of stocks of subsidiary companies, $258,473; manufacturing properties, $9,743,126; ore properties, $1,971,542; coal and coke properties, $2,043,169; transportation properties, $2,741,653; total, $16,757,963. Against this there was a credit of $171,430 on miscellaneous properties sold; leaving a net outlay of $16,586,533, as above.

The average number of employees in the service of all properties during the entire year was 168,127. The aggregate amount paid for salaries and wages of employees was $120,528,343.

The total number of stockholders in March, 1903, was 58,629 (of which 31,799 were preferred shareholders), in comparison with 43,019 (of which 25,296 preferred) at corresponding date in preceding year. The foregoing does not include the subscriptions for preferred stock by 27,379 employees under the plan offered them under date of December 31, 1902.

A NEW ANTHRACITE COAL MINE IN WALES.—The South Wales Primrose Colliery Company has struck what is locally known as the Red vein anthracite, in its new Tarrens Colliery, at Ynysygeinon. The seam is 3 ft. 7 ins. thick.

OPEN-HEARTH STEEL PRODUCTION IN 1902.

The American Iron and Steel Association has received from the manufacturers complete statistics of the production of open-hearth steel in the United States in 1902.

The total production of open-hearth steel ingots and castings in the United States in 1902 was 5,687,729 gross tons, against 4,656,309 tons in 1901, an increase of 1,031,420 tons, or over 22 per cent. As compared with 1898, five years ago, when the production of open-hearth steel amounted to 2,230,292 tons, there was an increase in 1902 of 3,457,437 tons, or over 155 per cent. The following table gives the production of open-hearth steel ingots and castings, by States, since 1899, in long tons:

States.	1899	1900.	1901.	1902.
New England....	57,124	74,522	170,876	179,923
N. Y. and N. J..	61,461	67,361	82,985	92,763
Pennsylvania ...	2,393,811	2,699,502	3,594,763	4,375,364
Ohio	117,488	130,191	184,943	278,854
Illinois	246,183	285,551	398,522	435,461
Other States ...	71,279	141,008	224,220	325,364
Total	2,947,316	3,398,135	4,656,309	5,687,729

The open-hearth steel made in 1902 was produced by 98 works in 16 States—Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, Tennessee, Alabama, Ohio, Indiana, Illinois, Michigan, Wisconsin and Missouri. Ninety works in 14 States made open-hearth steel in 1901. The States which have open-hearth furnaces, but which did not produce steel by this process in 1902, were Kentucky and Minnesota. The erection of a large open-hearth steel plant was commenced in Colorado in 1902, but open-hearth steel had not been made down to the close of the year. This State will, however, probably make open-hearth steel during the year 1903. Maryland and Michigan again made open-hearth steel in 1902.

In the following table the production by States of both acid and basic open-hearth steel in 1902 is given, again in long tons:

States.	Basic.	Acid.	Total.
New England	110,961	68,962	179,923
N. Y. and N. J.....	54,296	38,467	92,763
Pennsylvania	3,459,702	915,662	4,375,364
Ohio	195,700	83,154	278,854
Illinois	384,951	50,510	435,461
Other States	290,923	34,441	325,364
Total	4,496,533	1,191,196	5,687,729

The increase in the production of acid steel in 1902, as compared with 1901, was 153,880 tons, or almost 15 per cent, while the increase in the production of basic steel was 877,540 tons, or over 24 per cent.

The production of acid and basic open-hearth steel compares as follows, for 1901 and 1902:

	1901. Tons.	1901. %	1902. Tons.	1902. %
Acid	1,037,316	22.3	1,191,196	20.9
Basic	3,618,993	77.7	4,496,533	79.1
Total	4,656,309	100.0	5,687,729	100.0

The total production of open-hearth steel castings in 1902, included above, amounted to 367,879 gross tons. The following table gives the production of open-hearth steel castings by the acid and basic processes in 1902, by States, in gross tons.

States:	Acid.	Basic.	Total.
New Eng., N. Y., and N. J.....	33,158	3,883	37,041
Pennsylvania	141,385	11,014	152,399
Ohio, Ill., and other States.....	80,932	97,507	178,439
Total	255,475	112,404	367,879

In 1901 the production of open-hearth steel castings amounted to 301,622 tons, of which 94,941 tons were made by the basic process and 206,681 tons by the acid process.

UTILIZING SLATE WASTE.—Preparations are being made in Wales to utilize the enormous dumps of slate waste that fringe the quarries. By a patented process the slate refuse is to be pulverized, mixed with a special binder, and finally pressed into blocks which it is said will stand a very high pressure before crushing. This composition is suitable for making roofing tiles, which can be marketed, according to the inventor, at a cheaper rate than the ordinary tiles. These tiles are light in weight, and can be produced in any color. Negotiations have been opened for the purpose of beginning operations soon, either at Llanberis or in the Nantlle Valley, where some of the more important slate quarries are situated. It is interesting to remark that in the United States pulverized slate is being used in the manufacture of pencils, cement and paints, products that sell at a good price. The utilization of the vast slate refuse heaps at the quarries will be most welcome, besides affording some profit to those associated with the industry.

ABSTRACTS OF OFFICIAL REPORTS.

Rio Tinto Company, Limited, Spain.

The report of this company for the year ending December 31, 1902, shows that the profits for the year from sales of copper and pyrites, and from miscellaneous sources, were £1,129,662. Deductions from this were as follows: Fixed charge on pyrites mined, £9,053; overburden account, £10,000; plant gone out of use and written off, £67,266; coal exploration outlay, £9,500; depreciation of securities, £1,100; reserve fund, £50,000; provident fund, £2,000; redemption of 4 per cent mortgage bonds, £68,440; total, £217,359, leaving a net balance of £912,303. From this balance the directors recommend the payment of dividends of 5s. per share—5 per cent—on preferred stock, and of 50s. per share—50 per cent—on common stock. These will require £888,756, leaving a balance of £23,547 forward to current year. Of the dividends proposed part—2s. 6d. on preferred and 22s. 6d. on ordinary stock—have already been paid as interim dividends.

The production statement for the year is as follows, in long tons:

	1901.	1902.	Changes.
Pyrites for shipment	633,949	627,967	D. 5,982
Pyrites for local treatment..	1,294,827	1,237,322	D. 57,505
Total mined	1,928,776	1,865,289	D. 63,487
Pyrites shipped to consumers	641,935	595,092	D. 46,843
Sulphur ore produced	119,683	117,704	D. 1,979
Copper produced at mines .	21,100	21,659	I. 559
Copper in pyrites shipped...	14,248	12,819	D. 1,429
Total copper	35,348	34,478	D. 870
Av. per cent copper in ore.	2.627	2.517	D. 0.110

The copper actually marketed during the year 1902, in all forms, was: Refined copper, 20,947 tons; copper in sulphate, 1,369 tons; copper in pyrites, 11,820 tons; total, 34,136 tons.

By the application of the fixed charge on pyrites mined the development account was reduced by £9,053 during the year, leaving a balance of £96,793.

The report says: "On the North lode the overburden removed amounted to 401,334 cubic meters, the entire cost of which has been charged to revenue. From the South lode opencast, 560,118 cubic meters of overburden were removed, the cost being charged to revenue. On the Lago opencast the quantity of overburden removed was 175,237 cubic meters. With the object of opening up a mass of ore, another new opencast has been begun at the Dehesa, and from it 171,459 cubic meters had been removed up to the close of the year. . . .

"The year opened with G.M.B. Copper as low as £45 12s. 6d., and the average of this standard mark for 1902 has only been £52 11s. 5d. per ton, against £66 19s. 8d. for 1901, showing an average drop in 1902 of £14 8s. 3d. per ton. For 1903 prospects appear more promising, the consumptive demand being brisker, while the stocks, both in England and America, show heavy decreases from those reported a year ago.

"The deliveries of pyrites in Germany in 1902 have been about the same as in 1901, while in the United Kingdom they have been lower. The sulphur in the ore has, however, been in better demand at a higher price. In washed sulphur ore the company's business is increasing on the Continent of Europe and in the United States.

"The bessemer plant which was erected at the mines in 1901 has been in full work since January, 1902, and has quite fulfilled expectations by reducing cost of manufacture and saving freight.

"The contents of the reserve heaps in fine copper are now estimated at 142,951 tons, and the yield by washing continues satisfactory; care is taken to keep the book value at the low figure of £4 6s. 10d. per ton.

"The production at Cwmavon is the largest on record since the establishment of these works, having reached a total of 20,583 tons. In this total is included 1,280 tons worked up from furnace bottoms which it was possible to spare time to extract, now that copper is received from the mines in 98 per cent bessemer bars instead of in 35 per cent matte. The stocks remaining there amounting to 4,217 tons, and consisting of refined copper, copper in process, precipitate and bessemer bars, have been, as usual, carried over at cost price.

"The public traffic on the railway shows a slight increase in 1902. Both the railway and pier are maintained in a high state of efficiency, and should easily deal with the larger traffic which the increasing shipments of washed sulphur ore will entail."

Mohawk Mining Company, Michigan.

The report of this company for the year 1902 shows receipts as follows: Balance from previous year, $31,385; sales of copper—226,824 lbs., at 11.65c.—$26,426; sales of mohawkite, $77,991; interest, $838; assessments collected, $308,026; total, $444,666. The expenses at mine were $446,071; Boston office, $6,464; freight, smelting, etc., $10,898; total, $463,433, showing an excess of expenditure amounting to $18,767.

The mine is in course of development, and the copper and mohawkite taken out were only the minerals recovered incidentally. The development done during the year included 330 ft. shaft sinking; 7,720 ft. opening levels, 305 ft. drifting on fissure vein; a total of 8,355 ft.

The expenses in detail were: Underground expense, $141,910; surface expense, $39,225; rock-house, $532; transportation, $1,215; stamp mill, $2,815; total mining, $185,697. The construction expenditures were: Railroad, $26,001; mine work, $52,484; mill, $121,437; mill site, $60,452; total, $260,374; making, with the mining expenses, a total of $446,071, as above.

President John Stanton's report says: "In order to provide the necessary funds for paying indebtedness, and for completing equipment in course of installation, as well as some capital for handling production, an assessment of $2 per share ($200,000) was levied, payable January 19, 1903. At the date of our last report, it was expected that the mill would begin stamping in the following July, but the delays by contractors in furnishing the mill machinery were so serious that it was not possible to put the first head in commission before December, consequently production began with that month. The second head was started early in January of the current year, and both heads have since that time been doing fair duty, although subjected to some delays such as are incident to the starting of a new mill. The quantity of rock stamped in December was 8,613 tons, which yielded 226,824 lbs. refined copper, or an average of 26.34 lbs. per ton. The quantity of rock stamped in the first two months of 1903 was 40,473 tons, which gave 993,064 lbs. refined copper, or an average yield of 24.5 lbs. per ton. This yield is practically the same as that of the same lode at the Wolverine Mine for the nine years ending July 31, 1902, which averaged 24.60 lbs. during that period. Since that time, however, the lower workings of the Wolverine have improved in richness, and the yield for the succeeding eight months has averaged about 30 lbs. per ton. The rock at the Mohawk Mine seems, however, to be somewhat harder than at the Wolverine, as the Mohawk mill does not, as yet, stamp quite as much rock per head as is stamped at the Wolverine.

"The cross fissures carrying mohawkite have ceased to be productive, and work thereon has been suspended.

"The third head of stamps is now under construction, and also a steel shaft rock-house, and a powerful hoisting engine with other equipment for No. 4 shaft, which has developed a large extent of productive ground. It is hoped that this shaft, as well as the third head of stamps, will be ready for work before the close of the coming summer, when preparations for the fourth head should follow. This

head, when installed, will complete the mill plant as originally projected."

United Alkali Company, Limited.

This is the British heavy chemical combination, formed in 1891, with a capital of £6,000,000 (half in 7 per cent preferred stock and half in common), of which £5, 718,670 has been issued. In addition to this stock capital, there is a bonded debt amounting to £2,706,560, upon which interest is paid annually at the rate of 5 per cent. The latest report of the company, covering the year ended December 31, 1902, gives the gross value of the property, plant, etc., at £7,226,661; stocks of manufactured products, raw materials, stores, etc., on hand, £738,488; debts owing to the company, £261,611; outstanding consignments, £36,649; investments, £478,213; cash on hand and bills receivable, £289,627. Summed up, the assets on December 31, 1902, amounted to £9,031,249 ($45,156,245).

The net profit from the year's operations was £242,796 ($1,213,980), to which should be added £38,107 brought forward from 1901; making a total of £280,902 available for distribution. Of this amount, £185,612 ($928,060) was paid as the 7 per cent dividend on the preferred stock, £15,000 has been transferred to debenture redemption account, and the balance of £80,290 ($401,450) brought forward. Nothing has been divided among the common stockholders who have not received a dividend in some years, and, in fact, have been paid only 19 per cent since the organization of the company, 12 years ago.

The appeal of the Acetylene Illuminating Company, Limited, in its suit against the United Alkali Company over the alleged infringement of patent rights, has been dismissed with costs by the Supreme Court.

During the year certain patent rights have been assigned to the Power-Gas Corporation, Limited; payment for which has been made by the allotment of £28,569 in shares to the United Alkali Company. These shares are included in the assets of the company under the head of investments, and the amount has been carried to suspense account; thus the transaction does not affect the profit and loss account for the year. The suspense account has been increased to £30,780 by the addition of the nominal value of shares in several other companies received in part payment of composition on bad debts already written off.

The report gives no details as regards the operations of the company during the year, but at the stockholders' meeting in Liverpool recently, it was stated that the prices for raw materials, other than pyrites, were lower than 1901. In the case of pyrites, of which large quantities are needed, the price has risen over 33 per cent. Deliveries of manufactured products were about the same as in 1901, but prices for most of the leading articles were lower. A feature of the trade was the disruption of the agreement with the German bleaching powder manufacturers. It is contended that the German works made certain demands for a renewal of the agreement which were not considered just. It was asked that the German manufacturers be allowed a large increase in their quota of the agreed production to compensate for the growth of their industry; that the United Alkali Company guarantee the delivery of a minimum quantity of German bleaching powder within the United Kingdom; that, on the other hand, the United Alkali Company should undertake not to sell for consumption in Germany and Switzerland; and, further, that the right be given to the German makers to sell in British home markets and in the United States at a difference in price in favor of the German article. To these demands the United Alkali Company demurred, hence the cancellation of the agreement on December 31, 1902. The result was a sharp drop in the price of bleaching powder on regular contracts, and an unremunerative trade for this year.

Concerning the American works of the company (at Midland, Michigan) it was stated that owing to the strike among the coal producers operations at the plant had been discontinued for some time.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake, and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Bulletin de la Societe de l'Industrie Minerale. Volume II, Part 1. 1903. St. Etienne, France; published by the Society. Pages, 360; with Atlas of 62 plates.

Estudios sobre los Carbones de Teruel, y Especialmente sobre la Cuenca de Utrillas. By Antonio Gascon and Emiliano de la Cruz y Diaz. Madrid, Spain; Ricardo Rojas. Pages, 172; illustrated.

United States Geological Survey. Geologic Atlas of the United States, New York City Folio. Washington; Engraved and printed by the Geological Survey. Atlas, 16 plates, with 20 pages descriptive text.

Die Wohlfahrts-Einrichtungen der Arbeitgeber zu Gunsten ihrer Angestellen und Arbeiter in Oesterreich. Part I, No. 2. Prepared in the Ministry of Commerce. Vienna, Austria; Alfred Holder. Pages, 120.

Notes on Metallurgical Analysis. Arranged for Students in Metallurgical Chemistry. By Prof. Nathaniel Wright Lord. Second Edition. Columbus, Ohio; published by the Author. Pages 228; illustrated. Price, $2.50.

The Foreign Commerce and Navigation of the United States for the Year Ending June 30, 1902. *Volume I,* 932 pages; *Volume II,* 780 pages. Prepared in the Bureau of Statistics, Treasury Department; O. P. Austin, Chief of Bureau. Washington; Government Printing Office.

BOOKS REVIEWED.

The University of Colorado Studies. Volume 1, *No.* 2. Arthur Allin and Francis Ramaley, Editors. Boulder, Colo.; published by the University. Pages, 184; illustrated. Price, 50 cents.

This is the second volume of a series of technical papers issued by the University of Colorado, and edited by the instructors connected with that institution. The papers in the present number are chiefly mathematical, but we expect to see, later in the series, others relative to mining. The object of the series is a good one, and some valuable matter should be included.

The Induction Motor. Its Theory and Design. By H. Roy de la Tour. Translated from the French by C. O. Mailloux. New York; the McGraw Publishing Company. Pages, 250; illustrated, Price, $2.50.

This volume is mainly of a technical electric class. It relates chiefly to the subject of making calculations for polyphase non-synchronous motors. It also explains the peculiarities of operation, and in general, the theory and practice of this class of motors. It is intended largely for students, and while there is a great deal of mathematical work in it, it is generally of a kind easily understood.

British Guiana. The Mining Ordinance No. 1, *of* 1903; *with Mining Regulations,* 1903. Collated with the Official Records. Georgetown, Demerara; Government Printer. Pages, 108.

This little volume gives the mining laws and regulations of the colony of British Guiana, brought up to the latest date. These laws are generally of a liberal nature and are intended to encourage prospecting and mining, while retaining a government supervision over the industry. It will be very useful to those who desire to work or invest in mines in that country. A supplement gives some medical statements as to the climate and the precautions to be observed in order to avoid, or if necessary, to remedy the malarial fevers and the intestinal diseases which are the result of the climate and local conditions of the colony. These are so well recognized that the regulations include a list of medicines which operators at mining claims are required to keep on hand for the benefit of the workmen employed.

Atlas of Designs Concerning Blast Furnace Practice. Compiled by Prof. Michael Pavloff. Ekaterinoslav, Russia; published for the author. New York; the David Williams Company. Atlas, 127 plates, each 14 by 10½ ins. Price, $5.

This atlas contains a large number of drawings of modern blast furnaces, collected by Prof. Pavloff, and engraved, as far as possible, on a uniform scale. The drawings include the general designs of furnaces, with details of construction and auxiliary machinery. The furnaces illustrated are of Russian, German, French, British and American design, and the drawings are generally good. The atlas would be of much service to those who are engaged in blast furnace work, and who wish to have an opportunity of comparing practice in different countries.

Report of the Inspector of Coal Mines of the State of Washington. 1901-1902. C. F. Owen, Inspector. Seattle, Wash.; State Printer. Pages, 60; illustrated.

This report gives a full account of the operations of the coal mines in the State of Washington in 1901 and 1902. It includes not only production, but full accounts of accidents occurring, condition of employees, wages and the like. Some figures are also given on the deposition of the coal mined, a considerable portion of which is shipped to California, while some goes also to Alaska and some to South America. The production of coal in Washington last year reached a total of 2,690,789 tons, while 4,342 men were employed at the mines. Of these, 34 were killed and 54 injured by accidents in the mines, showing rather a high proportion. This was due to some accidents which involved a considerable number of casualties. The inspection of mines is being carried out quite thoroughly under the State laws, and in several cases, companies have been obliged to put in improvements recommended by the inspectors.

O Manganez no Brazil. By Herbert Kilburn Scott. Rio de Janeiro, Brazil; reprinted from the *Journal do Commercio.* Pages, 58.

The writer of this monograph spent a long time in mining in Brazil, and has published a number of papers on mines and the mining industry of the country. The present monograph, which is written in Portuguese and published in Rio de Janeiro, contains an account of the manganese deposits of the Brazilian republic. The first chapter relates to manganese ores generally, and the uses made of them in the steel industry and for other purposes. The second chapter recounts the geology of the extensive manganese ore deposits of Brazil and the different occurrences of the ore in that country. The third describes the most prominent occurrences and the extent of the work which has been done upon them, while the fifth chapter shows their economic importance and the possibilities of their future development. The fourth and sixth chapters relate to the mining of manganese ores in other countries and its relation to the industry in Brazil, while the seventh and last chapter sums up the whole subject, showing the production and consumption in the world for a series of years. A brief bibliography gives the recent publications in different countries relating to manganese ores. The Brazilian deposits are very extensive, and will probably be of a great deal of importance in the future.

American Society for Testing Materials. Proceedings of Fifth Annual Meeting, 1902. Edited by Edgar Marburg, Secretary. Philadelphia; published by the Society. Pages, 388.

The American Society for Testing Materials is a section of the International Association, the object of which is to eventually form a general code which shall cover tests for materials of construction of

various kinds. The membership of the American Association includes a large number of well known manufacturers and engineers. The International Association had its origin in a meeting held in Munich, Germany, in 1882, at the instance chiefly, of the late Herr Bauschinger. Later meetings were held in Dresden in 1884, at Berlin in 1886, Vienna in 1893, Zurich in 1895. At the last meeting, the International Association was formally organized, and the second Congress was held at Stockholm in 1897, and the third at Buda-Pesth in 1901. The fourth Congress will meet at St. Petersburg in 1904, and meetings will be held biennially thereafter. The present membership includes nearly 1,900 companies and persons, of whom 232 are in the United States. Under the present arrangement, investigations and discussions are held by the different branches of the Association, the final decision resting with the International Congress. The president of the American Association is Dr. Charles B. Dudley, of the Pennsylvania Railroad. The scope of the Association is shown by the discussions held at the meetings. These included structural steel, rails, steel plates, cast iron, cement, building stones and brick. In the course of these discussions a number of valuable papers were submitted by members and reports were made on tests of different materials. We have heretofore referred to several of these reports. There is no doubt that a very useful work is being done by the Association and that some international standard regulations are needed. This necessity is rapidly becoming more urgent as trade between different countries increases, and the exchange of materials becoms more general.

Irrigation Institutions. A Discussion of the Economic and Legal Questions Created by the Growth of Irrigated Agriculture in the West. By Elwood Mead. New York; the Macmillan Company. London; Macmillan & Co., Limited. Pages, 392. Price, $1.25.

This work is based, the author says, on twenty years' experience in the development of irrigated agriculture in the arid West. Fifteen years of this time were devoted to the study and administration of irrigation laws as assistant State engineer of one commonwealth and territorial and State engineer of another. The duties of these positions brought the writer into personal and official relations with all classes of men to whom the problems of irrigation were of vital interest. These included not only farmers, ditch-builders and investors in irrigation securities, but also legislators and jurists who were shaping the legal principles which are to control the distribution and use of Western water supplies. All phases of the subject had to be dealt with. The plans for canals to carry water over the thirsty plains had to be passed upon; advice had to be given regarding the best methods of applying water to the land, and the amounts required to bring crops to maturity. The problems of co-operation and organization, inseparably connected with irrigated agriculture, had to be studied. Head gates had to be closed in times of scarcity, in order that other users of water should receive their just share of the common supply. The lessons of these years is that the vital agricultural problem of the arid West is to establish just and stable titles to water, and to provide for the efficient protection in times of need. Every farmer in this region comes to understand the overshadowing importance of water. Every irrigator from a stream is bound to his fellow-irrigators by their common tie of dependence upon it. The amount diverted by one ditch is a matter of concern to all other ditches below, because it affects the volume remaining for their use. The independent life of the farmer in humid lands is impossible. Irrigated agriculture is an organized industry, and the property and happiness of those engaged in it are largely determined by the character of its institutions.

The effort of the book is to impress these facts upon the reader, and to outline a system under which the best results can be secured by legislation. The work has been well done.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported.

Duty on Muck-bars.—Iron in the form of bars and known as muck bars is dutiable under the provision in paragraph 123, act of July 24, 1897, as bar iron, and is not dutiable as iron in "forms less finished than iron in bars and more advanced than pig iron" under paragraph 124 of said act. Appeal of Moorhead, Brother & Co. from Surveyor of Customs at Pittsburg; Board of General Appraisers.

Duty on Alpha-naphthylamin Hydrochloride.—"Alpha-naphthylamin hydrochloride" produced by treating alpha-naphthylamin, a free base, with hydrochloric acid, thus producing the former, which is a salt, and which is known and designated in trade by that separate and distinct name, and which is derived from coal tar, and used to be transformed into azo dyes, and is not a medicinal preparation nor a color or a dye, is not entitled to free entry under the provisions of paragraph 524, act of July 24, 1897, as "naphthylamin," but is properly dutiable at the rate of 20 per cent ad valorem, under the provisions of paragraph 15 of said act as a "preparation of coal tar."—Appeal of B. P. Ducas Company from Collector of Customs at New York; Board of General Appraisers.

When Seller Will be Entitled to Benefit of Reduction of Duties.—A merchant in San Francisco cabled to a coal dealer in New South Wales and offered to purchase two cargoes of coal, which read: "Offer subject to immediate reply 24s. cost freight and insurance exchange duty paid two cargoes," etc. The coal dealer replied, "ultimatum 24s. 3d." The merchant cabled accepting this offer, and later wrote the coal dealer: "We beg to confirm having purchased from you (stating kind of coal and price) cost, freight, insurance, exchange, duty paid, etc. It was held that the contract would be construed to mean that the coal should be delivered at its destination with all intermediate charges, including duties, paid by the seller, whatever might happen to be the time of delivery; the purchaser having no advantage of an intermediate reduction in custom duties"; and where such dealer drew a draft on the merchant for an amount less than the agreed price, under the existing duties, and such duties were afterwards reduced before the arrival of the cargo, the payment of the draft was on account, and not in full satisfaction.—Withers v. Moore (*71 Pacific Reporter*, 697); Supreme Court of California.

Precipitated Carbonate of Baryta.—The United States General Appraisers have sustained the protest of Gabriel & Schall against the decision of the Collector of the Port of New York in assessing duty on precipitated carbonate of baryta as a chemical salt under paragraph 3 of the Tariff Act of 1897 at the rate of 25 per cent ad valorem. In the protest the merchandise was claimed to be free of duty under paragraph 489, which provides for "baryta, carbonate of, or witherite." A similar assessment has formerly been made and protested by the importers, and when their contention was overruled an appeal was taken to the United States Circuit Court, whose opinion follows in part:

"Baryta, carbonate of, or witherite.—One is chemically prepared and the other is a native ore of the same kind, used for the same purpose. Under the words of the section both are similar articles; and the plain meaning of the words of the paragraph would seem to be that either carbonate of baryta or witherite is exempt. If not either, but only witherite, the other words would have no meaning whatever. The evidence shows that under similar words in the act of 1890 this was passed free by the customs officials. There is no apparent reason for excluding one more than the other from the free list, and that case does not seem to require that the carbonate expressly mentioned in the list should be excluded from it."

The board acquiesced in this decision and reversed the decision of the Collector.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the Managing Editor.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Gold in Maine.

Sir.—Perhaps I can help you in your discussion about gold in northwestern Maine, by recalling observations made in 1861-62, when I was employed as State geologist of Maine. In my report for 1861 I find the substance of the statements as follows: "Quite an extensive area in the region watered by Sandy River has shown evidences of the existence of gold. As it has been seen only in earth, some have inferred that it has been transported by the ice in the glacial period. It was first found in Madrid by a returned California miner, afterwards at various localities upon Sandy River, between its source and New Sharon. Specimens of it from Mount Vernon have been presented to us for exhibition in the State Museum at Portland, since destroyed by fire. Other localities have yielded gold still farther north. One man dug out $30 worth on Sandy River."

Since the above observations were made the auriferous district of the Chaudiere in Quebec, bordering the State of Maine, has been more fully developed, and it would seem likely that the deposits in Somerset and Franklin counties as well as those at Mount Glines, belong to the same field. I shall be glad, therefore, to encourage prospectors to center their efforts in this virgin territory, hoping that remunerative returns will be forthcoming.

C. H. Hitchcock.

Hanover, N. H., March 28, 1903.

The Federation of Technical Societies in England.

Sir.—My remarks on the subject of the federation of English technical societies have been somewhat misunderstood by Mr. Bennett H. Brough. The subject is an extensive one, but when writing my article I did not feel justified in occupying a very large amount of your space, on a subject which is of interest more to Englishmen than to Americans. To prevent misconception, however, I think it best to explain further.

In the first place, I am aware that the question of federation is not at present before the councils of the various institutes, and I was careful to avoid saying so. There is, however, a strong feeling among many people that some arrangement should be come to between the various societies.

Secondly, my proposition for revision of the relative positions of the various societies, their objects and scope is not so drastic as Mr. Brough imagines. The organization and rules of membership of each individual society should not be interfered with at all, and the *Transactions* of each should continue as before. My contention is that the Institution of Civil Engineers should alter with the times and devote itself to what is now understood as civil engineering, as distinct from electrical engineering, mechanical engineering, mining and metallurgy. The bulk of the papers read before the Institution relate to civil engineering, and the majority of the Council and members are connected with railways, water works, bridges and roofs, sewage, roads, etc. The remainder of my contention is that all societies should rank equally, each dealing with its own particular subject. Then an agreement of some sort, or mutual understanding, or federation, should be arrived at, to provide a committee representing all societies, to take action, where common action is desirable in the interests of the engineering profession, and to arrange for the investigation or discussion of problems that are of important interest to all branches of the profession. Such a step would, undoubtedly, be welcomed by the majority of engineers, and the proposition only wants to come from some influential public man to be accepted on every hand.

Mr. Brough points out that I omitted naval architecture from the list of subjects mentioned in the

charter of the Institution of Civil Engineers. My object in naming this particular branch of engineering was to point out that when the Institution was formed there were no iron nor steel ships, and the use of steam as a propulsive agent was not taken seriously. If I had treated the subject more fully, my remarks would not have been open to question on the score of accuracy.

I do not agree with Mr. Brough that competition in the securing of papers in overlapping fields is advantageous; as an example in detail, I think it would be better policy for the Institution of Mining Engineers, whose headquarters are at Newcastle, to devote itself chiefly to subjects of interest to British coal and iron people, and for the Institution of Mining and Metallurgy to deal with silver and gold, lead, copper and allied industries at home and abroad. At a recent meeting of the Institution of Mining Engineers there were papers read on gold mining, with the result that the attendance was not over a dozen, showing that members were not vitally interested in the subject. Another instance may be mentioned. Some years ago several papers by Sir Lowthian Bell and others on blast-furnace practice, were read and widely discussed. In searching for these papers, one naturally turns up the old volumes of the Iron and Steel Institute. They are not to be found there, however, but in the *Transactions* of the Institution of Mechanical Engineers.

Finally, I may add that when I wrote my article I was thinking of the interests of the mining man, and particularly of members of the Institution of Mining and Metallurgy.

EDWARD WALKER.

London, April 2, 1903.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Soapstone.—Can you tell me anything of the value of steatite or soapstone and the production in the United States? Is there any duty on importation of the article?—J. A. R.

Answer.—The production of soapstone in the United States in 1901 was 28,643 tons; in 1902, about 29,500 tons. The value ranges from $10 to $15 per ton at the quarry or place of production. There is no duty on soapstone in the crude or unmanufactured form. Among the dealers in this article are Hamill & Gillispie, 240 Front Street, New York; and the S. P. Wetherill Company, 100 William Street, New York.

Vanadium in Iron Ore.—Would an iron ore well located for shipping on Lake Superior—assaying 47.81 iron; 0.19 phosphorus; 11.35 titanium; 0.26 vanadium—have any added value because of the vanadium of the above percentage? What effect would this per cent of vanadium have on steel manufactured from this ore?—B. A. F.

Answer.—The presence of vanadium in your ore would not give it any additional value. It is not likely that the trace of vanadium shown would have any effect upon steel made from the ore. The high percentage of titanium, however, would deprive the ore of value. No iron-maker would be likely to take it.

Zinc Dust.—Is zinc dust superseding filiform zinc, or zinc shavings, in the cyanide process? Is it likely to come into general use? How is it produced? Is special machinery required to make it?—W. H.

Answer.—Zinc dust is not manufactured from metallic zinc, as zinc shavings are; it is made by the smelters as a by-product, being the fume or fine zinc which escapes from the condensers. It is sold in the form of dust. Some dust is made by American smelters, but the larger part of the supply comes from Germany. Formerly most of the dust was used for making paints, but recently the application of this material in the cyanide process, for precipitating gold from solution, has made considerable progress. It is claimed that it costs less than zinc shavings, and presents a greater surface for precipitation. In this country it is used at the Mercur Consolidated, in Utah, and at some other large cyanide plants. Zinc dust usually sells, in large quantities, at about 80 to 85 per cent of the price of spelter, or metallic zinc.

Early Coal Mines.—Can you tell me when and where coal was first found and mined in the United States? Was it not in Pennsylvania?—N. M. D.

Answer.—The earliest mention of coal in this country seems to be that of Father Louis Hennepin. He speaks of a coal mine, above Fort Crevecoeur on the Illinois River, not far from the present city of Ottawa, Ill., 75 miles southwest of Chicago. He saw the coal as early as 1679, and in his description of the country, published in 1698, he says there are "mines of coal, slate and iron." The existence of coal in Illinois may well have been known to the early French explorers in the middle of the seventeenth century, but it is highly probable that the mines referred to by Father Hennepin were not worked at all in his day or for 150 years afterward. The existence of coal in Virginia was noticed by Col. William Byrd in 1701, in Ohio by Lewis Evans in 1755, and in Western Pennsylvania by Col. James Burd in 1759. The Virginia deposits near Richmond were the first mines opened regularly in this country. Mining was begun there about 1750, and the coal was sold at Richmond in 1766 for 12d. (24c.) per bushel, and in 1789 at Philadelphia for 1s. 6d. (37c.) per bushel of 76 lbs. This coal was also exported in some quantity. The coal mines of the Richmond Basin are now worked only in a very small way.

PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending April 7, 1903.

724,426. PROCESS OF MAKING TUBING.—Frederick F. Bischoff, Chicago, Ill., assignor to Carl C. Law, Pittsburg, Pa. A method of making tubing which consists in laterally bending a strip of metal in a single operation, by means of traveling pressure, first, to semicylindrical form, second, to horseshoe form, and third, bringing the flanges together at an acute angle by means of pressure exerted on said edges in a downward direction.

724,501. HYDRAULIC DREDGE.—Jesse W. Reno, New York, N. Y. In a dredge, the combination with a vessel, of a pump upon said vessel, a suction-pipe connected to said pump, a movable pipe exterior to said vessel adapted to lead downward in an inclined direction, and a universal-joint connection connecting said movable pipe with said suction-pipe.

724,503. SOLDER.—Edward C. Rice and Henry F. Monk, Cripple Creek, Colo. An aluminum-solder resulting from the fusion of mercurous chloride 19 parts, magnesium chloride 15 parts, zinc 12 parts and cadmium 9.5 parts.

724,524. PROCESS FOR PRODUCING ALLOYS.—William C. Tilden, Washington, D. C., assignor to John Lovett, Martinsburg, W. Va. A process for producing a metallic alloy from a group of metals which consists in first producing a metallic bath by fusing one of said metals and in subsequently fusing the remaining metals in said bath in the inverse order of their fusibility, the temperature of the bath being reduced below the boiling-point of each successive metal before the introduction thereof in said bath.

724,536. DIAMOND-SPLITTING MACHINE.—Asser J. Benjamins, Brooklyn, N. Y. The combination of a work-holder comprising spaced opposing members adapted to hold the article between them and one adjustable relatively to the other to clamp said article, with a cutter arranged to move in a plane which passes between the members of the holder and which is parallel to the direction in which the clamping movement of the holder takes place.

724,540. CONVEYER.—Henry E. Brett, Los Angeles, Cal. A conveyer provided with a frame, wheels movably mounted on shafts journaled in the upper and lower portions of said frame in zigzag relation, an endless carrying element passing alternately up over and down under said wheels in succession, separate driving devices mounted upon the shafts of certain of the guiding or supporting wheels, a driving belt or chain passing over said separate driving devices and driving the same continuously and means for driving said belt.

724,549, 724,550, 724,551 and 724,552. INGOT-HEATING FURNACE.—Fred H. Daniels, Worcester, Mass., and Samuel T. Wellman and Charles H. Wellman, Cleveland, Ohio; said Wellman and Wellman assignors to the Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio. An ingot-heating furnace comprising two communicating chambers in combination, a continuous chamber adapted to receive the ingots at one end and to have them advanced therethrough standing on end in opposition to the passage of the products of combustion, and a finishing-chamber at the discharge end of the continuous chamber, said continuous chamber being heated by the products of combustion passing into and through it from the finishing-chamber, and the latter chamber communicating with the continuous chamber so as to receive the ingots directly therefrom, said finishing-chamber having a door in line with the continuous chamber for the introduction of a tool to withdraw the ingots end foremost from the continuous chamber onto the bed of the finishing-chamber.

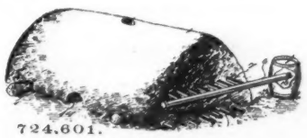
724,561. TUBE-WELDING MACHINE.—Henry A. Fergusson, St. Paul, Minn. A tube-welding machine, comprising, in combination, a mandrel, a housing adjacent thereto, an active welding-roller having journal-support in said housing upon one side of the mandrel, means for rotating said roller and means for moving the housing toward and away from the mandrel, and passive supporting-rollers arranged upon the opposite side of the mandrel and operatively connected with said housing so as to be movable therewith, but in an opposite direction

724,580. ELECTROLYTIC CELL.—Rudolph Johanns, Brooklyn, N. Y., assignor to Friedrich Junge, Silver Lake, N. Y. An electrolytic cell comprising an anode, a cathode, an inverted trough above the cathode, and a conduit extending from said trough to a point beyond the limiting-surface of the electrolyte

724,581. QUICKSILVER-ROASTER.—Albert Johnson, San Luis Obispo, and Robert McKay, San Francisco, Cal. A device consisting of a bench of pipes arranged with suitable doors at one extremity, suitable outlets arranged at the opposite extremities of said pipes, a fireplace, a winding flue beneath said pipes and leading from said fireplace, and a plurality of arched flues passing over said pipes and from said winding flues.

724,588. BRIQUETTING-MACHINE.—William A. Köneman, Chicago, Ill., assignor to International Fuel Company, Chicago, Ill. In a briquetting-machine, a pair of companion traveling endless belts carrying co-operating mold-sections arranged to register with each other and travel together through a prolonged course in the movement of the belts, a compressing-plunger in a member of each pair of co-operating mold-sections, and an inclined plane in the path of said plungers operating to engage and actuate the plungers in their movement along said course to form the briquettes.

724,601. METHOD OF MAKING CHARCOAL AND OF CONSERVING THE VAPOROUS DISTILLATES THEREOF.—Frank W. Newberger, Stemper, Fla. A method of making charcoal and of conserving the vaporous



724,601.

distillates thereof, which consists in inclosing the logs to form the charcoal in an air-tight covering having means associated therewith to supply air as requisite to the pile, disposing between the logs, at the lower portion of the pile, downwardly-inclined collectors which operate to catch the vaporous distillates as generated within the pile and convey them without the pile, and then condensing the distillates.

724,603. EXCAVATOR.—Peder Nielsen, Detroit, Mich. In an excavator, the combination with a suitable supporting structure, of a wheel, having excavating-scoops, rotating on a horizontal axis and swinging on a vertical axis.

724,608. MACHINE FOR MOLDING ARTIFICIAL STONE.—Noyes F. Palmer, Brooklyn, N. Y. In a machine for molding artificial stone, the combination of a mold with a false bottom, a partition-carrying plunger, and independent means for operating said false bottom and plunger.

724,618. PROCESS OF SOLIDIFYING AND TOUGHENING OILS.—Joseph B. Scammell and Ernest A. Muskett, London, England. A process which consists in adding to the oil a certain proportion of fibrous material, and thereafter stirring the mixture together with a solution of chloride of sulphur until the fiber is completely dissolved whereby a tough and homogeneous mass is formed.

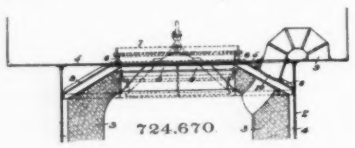
724,637. PROCESS OF TREATING COMPLEX ORES OF ZINC.—William C. Wetherill, Canon City, Colo., assignor

to the Empire Zinc Company, Denver, Colo. A method of recovering the precious metals and other valuable metals from zinc-bearing ores with which they are associated, which consists in apportioning to or associating with such ores a sufficient quantity of iron to ultimately render the said metals (by the resulting combination) susceptible to magnetic separation, then reducing and distilling off the zinc by the aid of an excess of carbon in a closed retort, thereby producing a carbonaceous residuum containing iron in association with the said metals to a degree sufficient to render the latter magnetic, crushing the residuum, and separating the magnetizable precious and other valuable metals therefrom by magnetic attraction.

724,641. BLOWING-ENGINE OR COMPRESSOR.—Edward Wiki, Basle, Switzerland. In a blowing-engine, the combination with a slide-valve moving over a port or ports of the compressing-cylinder and having a series of approximately parallel slots, forming ports, leading through it, through which ports the air from the cylinder is delivered to the receiver, of a spring-plate secured to the back of the valve at one end and extending across the ports, and a light metal flap-valve formed with or attached to the spring, and having cross-bars arranged to extend over the slot-ports with slots separating said bars to give free passage to the air when the valve lifts.

724,666. TUNNELLING-SHIELD.—Theodore Cooper, New York, N. Y. The combination with a tunneling-shield of a forward bulkhead therefor having an opening in its lower part through which the excavation is carried on and means for adjusting and maintaining the angle of slope of the external material facing the end of the shield.

724,670. BLAST-FURNACE TOP.—John C. Cromwell and Carl W. A. Koelkebeck, Cleveland, O. A blast-furnace having an outer vertically-extending metal shell, an inner masonry stack, a horizontally-extending metal top plate

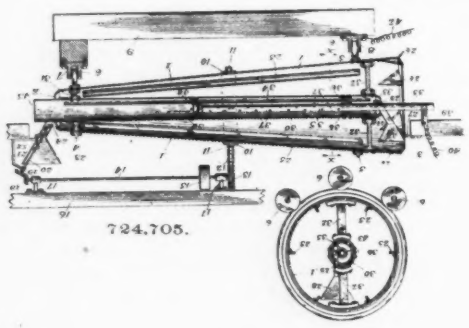


surrounding the opening in the top of the furnace and connected to the outer shell, and radial upwardly-inclined braces entirely outside the masonry stack and connected to the metal shell and to the top plate at or near the inner edge of the latter, said top plate being entirely outside the masonry stack and forming the working platform at the top of the furnace.

724,679. ELECTROSTATIC SEPARATOR.—Clinton E. Dolbear, Boston, Mass., assignor to the American Mining and Metal Extraction Company, Boston, Mass. In an ore-separating apparatus, the combination of a source of high-potential electricity, a pair of similarly-charged plates connected therewith and between which the ore is caused to pass, a third oppositely-charger plate located between the first two, and means for collecting separately the separated materials.

724,703. DREDGING-MACHINE.—James W. Humphreys, Iroquois, Ill. A dredging machine, having an endless belt of scoops and pulleys furnished with outstanding oppositely-cutting edges or lips, and encompassed by said belt of scoops.

724,705. ORE-SEPARATOR.—Hans G. Johnson and Monroe S. Howard, Waukon, Iowa, assignors of nine-tenths to the Eureka Mining, Smelting and Power Company, Waukon, Iowa. An ore-roasting mechanism comprising a base

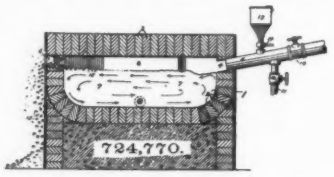


member; supporting-trunnions carried by said base; a conical exterior casing having annular track-rails at each end adapted to rest upon said trunnions; a feed mechanism adapted to deliver the ore into one end of the said outer casing; longitudinally-disposed flanges carried by the exterior casing adapted to agitate the ore therein; an interior chamber and pockets carried at one end of the exterior chamber whereby the ore will be delivered from the exterior chambr into the interior chamber.

724,707. STONE-DRESSING MACHINE.—Albert F. Jones, Salem, Mass., assignor to American Granite Machine Company, Salem, Mass. In a stone-dressing machine, a traveling turret support, a turret carried by it revoluble on a vertical axis, a frame located beneath and carried by said turret and adapted to oscillate on a horizontal axis at right angles to the movement of the turret, means for securing said oscillating frame in whatever position it may be set, a tool carried by said oscillating frame, a stop carried by said oscillating frame which limits the downward movement of the tool, an elastic actuator for thrusting said tool downward against said stop, a cam for raising said tool against the action of said elastic actuator and means for rotating said cam in any position of adjustment of said oscillating frame and turret.

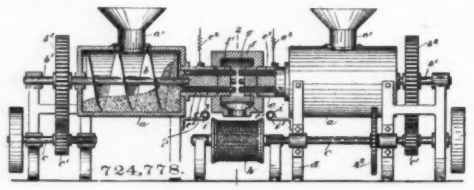
724,764. PROCESS OF MAKING EXPLOSIVES.—Henry Wasbers, York, Pa., assignor to Rockdale Powder Company. A process for the manufacture of dynamite in conjunction with the manufacture of black powder, which consists in incorporating with the powder-dust resulting from the granulation of the pressed powder-cakes, nitronaphthalene, and finally adding to the admixture thus obtained, nitroglycerine.

724,770. ART OF MAKING STEEL.—Frank E. Young, Canton, Ohio. A process of simultaneously skimming, pud-



dling, and converting molten iron into malleable iron or steel, consisting in projecting a blast along and across the entire surface of the molten metal.

724,778. ELECTRICAL SMELTING APPARATUS.—Robert L. Barnhart, Charleroi, Pa. The combination of two oppositely-situated orificed heads adapted to be charged with



electricity and insulated from each other, means for forcing the plastic minerals through said orificed heads, forming meeting rods or bars of the minerals, for the purpose specified, and an insulating-box lying between the heads and covering the adjacent ends of the said heads.

724,810. DURABLE ELASTIC ALBUMINATE AND ALBUMINATE-CONTAINING MATERIAL.—Axel V. H. F. C. Clauson-Kaas, Copenhagen, Denmark. A method of rendering albuminates lastingly flexible, which consists in mixing therewith the hydroxide of a metal, said hydroxide not capable of coagulating the albuminate.

724,826. GOLD-ANNEALING APPARATUS.—Charles F. Dwight, Marcus, Iowa. A gold-annealer comprising a sectional oven having an inner support for the gold to be annealed, each section being provided with double walls forming a flue, the flues registering with each other when the sections are assembled to form a continuous passage for heated gases or products of combustion.

724,842. VOLTAMETER FOR THE ELECTROLYSIS OF WATER.—Pompeo Garuti and Riccardo Pompili, Tivoli, Italy. In a voltameter for the electrolysis of water, an apertured metallic diaphragm and pervious metallic coverings on both faces of the apertured portion of the diaphragm.

724,852. PORTABLE FORGE.—Albert J. Gurney, Streator, Ill. A portable forge comprising two vertically-joined, approximately equal shells or casings forming when united a blower-chamber, a throat and ash-chamber and a hearth all arranged in vertical alinement, integrally-connected hearth-sections on each shell, an unfolding portion on each hearth-section and a train of gears adapted to operate the forge, and disposed to coincide with the contour of the shells.

724,862. CATHODE.—Charles J. Henry, Perth Amboy, N. J. A cathode-plate for receiving removable sheet-metal deposits comprising a body to receive the deposits having superficial areas, flanges surrounding the opposite side edges and lower end of the plate by forming rabbets at such parts of the body, said flanges having perforations therethrough, and a plastic insulation applied to the flanges and engaging the perforations.

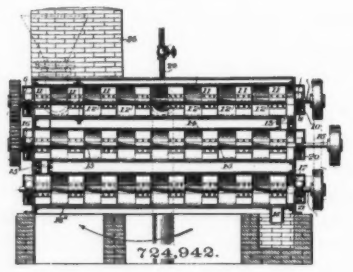
724,876. BRIQUETTING-MACHINE.—Andru Johnson and John C. Crofts, Nelson, Canada. A machine comprising a movable mold having a bore extended therethrough, a closure member adapted to project into one end of the bore and form an abutment, a plunger operating in the other end of the bore to oppose the said abutment, a drive-shaft, connections joining the drive-shaft, the plunger and the mold, adapted to sustain the mold in a stationary position during the compressing operation of the plunger, and to move the said mold away from the abutment and the compressed article as the plunger recedes, and a pusher-device independent of the mold for engaging the compressed body and discharging it, as the mold moves from engagement therewith.

724,892. CEMENT-LINED PIPE.—John T. Langford, Newton, Mass. The combination with a metallic pipe, of a lining of cement provided on its interior with a smooth coating of japan.

724,904. CASING-PERFORATOR.—Patrick H. Mack, Bradford, Pa., assignor to Oil Well Supply Company, Pittsburg, Pa. In a casing-perforator, the combination with a perforator-head having an axial wedge-passage, and radial punch-chambers having shoulders on their interior, of punch-cases adapted to engage the shoulders on the interior of the punch-chambers, means for confining the punch-cases in the head, punches, and a wedge for projecting the same.

724,936. LIMEKILN.—Henry Ragot, Brunswick, Me., assignor of 51 per cent to Herbert L. Shepherd, Rockport, Me. In a kiln, a generator, an ignition-chamber connected therewith, a stack leading from said ignition-chamber, the interior diameter of said stack increasing from the top to the roof of the ignition-chamber, and a discharge-hopper with a removable bottom situated beneath said ignition-chamber with an air-space completely surrounding said hopper and in constant communication with the outer air and conduits leading from said air-space into the top of said hopper and also into said ignition-chamber.

724,942. ORE-ROASTING FURNACE.—George F. Rendall, New York, N. Y. In an ore-roasting furnace, a retort, a conveyor suitably mounted therein, means for rotating said conveyor, a second retort situated adjacent said



first-mentioned retort, a passage forming a communication between the interior of said retorts, a conveyor in the second-mentioned retort, means for rotating said conveyer in an opposite direction from the line of travel of the conveyor in the first-mentioned retort, a pipe leading downwardly from the uppermost retort near its mid-length, a steam-blast located to discharge directly into the vertical portion of said pipe and a nozzle on the end of the steam-blast pipe within the pipe leading from the uppermost retort.

724,965. KILN.—Harry Stehmann, Whitcliffs, Ark., assignor to Dora Stehmann, Whitecliffs, Ark. A kiln having a drying and feeding device, comprising a revoluble drum opening at one end into the kiln, a pipe arranged centrally in the drum, said pipe opening at its lower end into the kiln and provided with openings at its upped end, and a guard extending over the upper end of said pipe.

Reissue No. 12,104. ELECTRIC FURNACE.—Edward G. Acheson, Niagara Falls, N. Y. Original number 718,892, dated January 20, 1903. An electric furnace having a carbon electrical conductor with a protecting layer of refractory carbide and having electrical connections at the ends of the conductor.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending March 21, 1903.

4,479 of 1902. ORE GRINDER.—T. Breakall, Wirksworth. An improved muller and mortar for grinding and mixing ores, both rotating, but eccentrically with each other.

5,292 of 1902. MINERS' LAMP.—R. Fielendorf, Vienna, Austria. An electric igniter for miners' oil lamps which incandences when brought into position over the wick.

6,352 of 1902. MINE CAGE SAFETY STOP.—F. W. Phillips and G. H. Redfern, Worksop. Automatic apparatus for supporting pit cages when the winding rope or other support gives way.

7,590 of 1902. SAFETY BRAKE FOR MINE HOISTS.—Compagnie des Mines de Bruay, Bruay, France. Automatic electric device for shutting off steam and applying the brake in winding plants at mines, in case of neglect by the engineer.

27,645 of 1902. DUST SETTLER FOR MINES.—T. J. Britten, Johannesburg, Transvaal. A spray of water to blow on drill holes and at a distance from the face when blasting, in order to settle the fine rock dust given off.

27,710 of 1902. PUDDLING FURNACE.—A. S. Jardine, Coatbridge. Improved arrangement of brickwork of puddling and reheating furnaces, to allow better access of air.

401 of 1903. MINERS' LAMP.—J. Jacobsen and G. A. Nordquist, Great Falls, Mont., U. S. A. A miners' gasoline lamp, to hold in front of cap, that will always keep an upright position.

1,321 of 1903. LOCK FOR MINERS' LAMPS.—P. Wolf, Zwickau, Germany. An improved magnetic lock for miners' safety lamps.

ANNOUNCEMENT.

We find it desirable to state that the company owning the ENGINEERING AND MINING JOURNAL has not purchased and will not purchase the *Pacific Coast Miner*, with which publication intimate relations have been maintained for the past four months. The ENGINEERING AND MINING JOURNAL is in a particular sense the organ of the mining and metallurgical professions of America, and while we wish well to all those who are doing good work in their respective fields of activity, it is found inexpedient to form an alliance with any local paper anywhere.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mr. Edward G. Stoiber is now in Japan.

Mr. Arthur S. Dwight is in New York City.

Mr. James B. Grant is in New York City on a visit from Denver.

Mr. James W. Abbott has returned to Denver from a mine inspection in Arizona.

Mr. F. Augustus Heinze left New York City April 9 on his return to Butte, Mont.

Mr. John L. Reid, of Ouray, Colo., is making a tour of the mining districts of Mexico.

Mr. F. K. Probert is now engaged in the examination of a large copper mine in southern Arizona.

Mr. S. B. Elbert, of Rollinsville, Colo., has returned from a six weeks' mining trip to Old Mexico.

Mr. William Graves, of Salt Lake City, Utah, has gone to Nicaragua, where he has accepted a position.

Mr. Walter H. Weed, of the United States Geological Survey, has been in New York City during the week.

Mr. R. S. Mercur succeeds Mr. G. M. Williams as manager of the Kingston Coal Company at Kingston, Pa.

Mr. G. W. Watkins, of the Christensen Engineering Company, of Milwaukee, Wis., has sailed for Europe.

Prof. H. A. Wheeler has been examining coal properties in Arkansas and Indian Territory for St. Louis, Mo., men.

Mr. P. H. Burnett has been appointed industrial agent of the Lehigh Valley Railroad, with offices in New York City.

Dr. P. G. Lidner, engineer to Mr. J. B. Haggin, has recently returned from Siberia and has gone this week to Mexico.

Mr. George W. Elliott, of Seattle, Wash., is in Mexico examining his properties in Guerrero, Oaxaca, and Michoacan.

Mr. R. B. Hughes, superintendent of the Holy Terror Mine at Keystone, S. D., has been in San Francisco, Cal.

Mr. William L. McLaughlin, of Deadwood, S. D., has been chosen general manager of the Horseshoe Mining Company.

Mr. H. V. Winchell, geologist to the Anaconda Copper Company, has returned to Butte after a journey to Sonora, Mex.

Mr. C. Egan, manager of the San Marcial Coal Company, at San Marcial, Sonora, Mex., has been in San Francisco, Cal.

Mr. Arthur Thacher has returned to St. Louis, Mo., from the West, where he has been examining some asphalt propositions.

Mr. Frank H. Probert, of Los Angeles, Cal., has been appointed consulting engineer to the Shannon Copper Company at Clifton, Ariz.

Mr. Joseph Barrett, at present associate professor at Lehigh University, has been appointed to a similar position at Yale University.

Mr. Ralph Nichols arrived in New York City on the *Ivernia*, on April 13, en route from London to West Australia, via San Francisco.

Mr. Alliene Case, manager of the British & Canadian Lead Company, of Temiscamingue, Quebec, is in New York City, en route from London.

Mr. Arnold Hague, of Newport, R. I., for many years connected with the United States Geological Survey, has been in San Francisco, Cal.

Mr. Martin J. Heller, of the engineering staff of Capt. J. R. De La Mar, was in Los Angeles, Cal., recently, transacting important business.

Mr. William S. Noyes, of San Francisco, has returned to the Pacific Coast to look after a gold dredging proposition for St. Louis, Mo., men.

Mr. T. H. Holland has been appointed director of the Geological Survey of India, in succession to Mr. C. L. Griesbach, who has retired.

Mr. Robert H. Jeffrey, general manager of the Jeffrey Manufacturing Company, Columbus, O., was elected mayor of Columbus at the April election.

Mr. J. May, formerly with the Valardena Company, Durango, Mex., is assistant manager of the Gold Coin Company at San Javier, Sonora, Mex.

Sir William Pearson, of London, who has been in Mexico for some months, looking after his interests in the Tlalpujuhua District, left for home recently.

Col. T. G. Bush, president of the Alabama Consolidated Coal and Iron Company, has personally visited all the properties of the company in Alabama.

Mr. W. Parker, manager of the Maggie Gibson Dredging Company, near Virginia City, Mont., recently returned from an extended visit to Chicago, Ill.

Mr. E. P. Mathers, editor of *South Africa*, is expected in New York City early in May. Mr. Mathers intends to visit the principal mining districts of this country.

Mr. W. H. Adams has arrived in New York after three months' professional work in California, Oregon and Idaho. He returns to the Pacific Coast this week.

Mr. W. H. Argall, from London, passed through Denver a few days ago, after completing a professional trip to California. He will return to England at an early date.

Dr. Theo. B. Comstock, of Los Angeles, Cal., has been in Durango, Mex., to consult and advise with New York City men on working some extensive mining properties.

Mr. A. M. Smith, formerly foreman of the Nevada Reduction Works, at Dayton, Nev., has gone to Punta Arenas, C. A., where he will take charge of a large milling plant.

Mr. Philip Hartman, who for nearly 20 years has been in charge of the Scott coal plant at Ehrenfeld, Pa., has been chosen superintendent of the Haws Coal Company at Holsopple, Pa.

Mr. Edward S. Farrow, late United States Army, a mining engineer of New York City, will start shortly upon an exploring trip into the Peace River country, Northwest Territory, Canada.

Mr. W. H. Snelson, of Breckenridge, Colo., has been looking over the prospects in the Northern mining districts of Gilpin County, along the proposed line of the new Moffat road.

Mr. C. M. Fassett, of Spokane, Wash., is drawing plans for a combination amalgamation and cyanide mill, to be built for the Bodie Mining Company, 16 miles from Midway, B. C.

Mr. Emerson Gee has left Los Angeles, Cal., for a month's trip to the west coast of Mexico, on mining business. On his return he will open an office as consulting mining engineer in Los Angeles.

Mr. F. L. Brown, formerly assistant superintendent of the Tacoma Smelter, is in charge of the laboratory and analytical work for the Oregon Smelting and Refining Company, at Sumpter, Ore.

Mr. W. H. Routledge, of San Francisco, Cal., manager of the Green Mountain copper mines in Maricopa County, Cal., has been looking over the Tonopah mining field in the interest of California men.

Mr. E. E. Bushnell, mechanical engineer at the Minnequa Works of the Colorado Fuel and Iron Company at Pueblo, Colo., has resigned, and will go to San Francisco, Cal., to engage in business for himself.

Mr. Frank Davis, formerly superintendent of the works of the Allis-Chalmers Company, at West Allis, Wis., has resigned to accept a position with the Westinghouse Machine Company, of East Pittsburg, Pa.

Mr. Oscar Lachmund, for some time past connected with the Majestic Mining Company, of Milford, Utah, has been appointed assistant superintendent of the Reforma Mine at Cuatro Cienegas, Coahuila, Mex.

Dr. James J. Dobbie, professor of chemistry and geology in the University College of North Wales, has been appointed director of the Museum of Science and Art, Edinburgh, succeeding Mr. F. Grant Ogilvie.

Dr. T. C. Harter, of Bloomsburg, Pa., who is interested in some mining developments in the Virgilina District, on the line of Virginia and North Carolina, has been in New York City looking up machinery.

Mr. Don H. Bacon, president of the Tennessee Coal, Iron and Railroad Company, has returned to his headquarters in New York City after spending a few weeks in Alabama among the various industries of that company.

Mr. John P. Brennen, who recently resigned as general manager of the Sharon Steel Company's coking interests, the concern having recently been absorbed by the United States Steel Corporation, will give his attention to the Central Connellsville Coke Company's operations, in which he is largely interested.

Mr. Hugh L. Cooper, for some time hydraulic engineer for the Stilwell-Bierce & Smith-Vaile Company, of Dayton, O., who recently acted in a similar capacity for the Sao Paulo Tramway Light and Power Company, of Sao Paulo, Brazil, has gone to Mexico to superintend the construction of the 40,000 h.p. plant to be erected by the Mexico Light and Power Company, of New York City, to generate energy for transmission to Mexico City, some 90 miles distant. The undertaking will involve an expenditure of nearly $7,000,000.

OBITUARY.

Albert Huntington Chester, curator of the geological museum and professor of chemistry and mineralogy at Rutgers College, died of pneumonia April 13, in New Brunswick, N. J., at the age of 60 years. He was born in Saratoga Springs, N. Y., and was graduated from Columbia. From 1870 to 1890 he was professor of chemistry in Hamilton College. He stood in high repute as a mining geologist. Among his publications were "Dictionary of the Names of Minerals" and "Catalogue of Minerals, with Their Chemical Compositions and Synonyms." He left a widow and a son.

John H. Paddock, who died recently in St. Johnsbury, Vt., was born in that town in 1820. His father established a blast furnace on the Passumpsic River, and after 1845 the sons, J. H. and J. C. Paddock, carried on the business for 30 years. In 1875 J. H. Paddock gave his entire attention to copper mining at Lyman, N. H., and invented the Paddock dry concentrator. In 1880 he went to Mexico to inspect mines for a Boston syndicate. In 1884 Mr. Paddock fell at his Lyman Mine and broke his hip. He never recovered from this accident, and for 20 years before his death lead a retired life.

William Root, better known by his many friends as Col. Bill Root, died suddenly of heart disease at Salt Lake, Utah, on April 12. Col. Root had the varied career of many a frontiersman. He was the companion of Buffalo Bill during the greater part of his life, and by turns was a newspaper man, miner and promoter, while he also won a wide reputation as a trapper of wild animals. He settled in Laramie when a young man, and took an interest in the Laramie *Boomerang* with Bill Nye. Some of the first stories Nye published dealt with the actual adventures of Col. Root during the turbulent days when the Union Pacific Railroad was opening the West. Col. Root took an active interest in many mining ventures, and was an old and valued correspondent of the ENGINEERING AND MINING JOURNAL.

SOCIETIES AND TECHNICAL SCHOOLS.

MINING SOCIETY OF NOVA SCOTIA.—The officers of this society are: President, Cornelius Shields, Sydney; vice-presidents, Alexander McNiel, Halifax; C. A. Meissner, Sydney; Clarence H. Dimock, Windsor; council, Alexander Dick, Charles J. Coll, Chas. Archibald, David Baker, J. H. Austen, S. H. Holmes, F. H. Mason, A. A. Hayward, C. N. Crowe; secretary, H. M. Wylde, Halifax; auditors, C. C. Starr, R. H. Brown.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.—The following appointments were recently announced: Mr. Leonard D. P. Dickinson, as assistant in electrical engineering; Mr. H. B. Litchman and Mr. Frederic W. Snow, as assistants in mining engineeign and metallurgy; Mr. J. Lloyd Wayne, as assistant in mechanical engineering; Mr. Gregg Richards, as assistant in geology; Mr. Robert V. Brown, as assistant in inorganic chemistry, and Mr. George E. Bradley, as assistant in metal work.

COLORADO SCHOOL OF MINES.—This school, situated at Golden, Colo., in its catalogue for the current year, describes the school buildings, the equipment of the various laboratories, the requirements for admsision, the necessary expense of students and the various departments and courses of study. The school has departments of mathematics, physics, chemistry, machine design and draughting, surveying, geology and mineralogy, mechanics and construction, hydraulics, thermo-dynamics, assaying, mining and metallurgy.

The present enrollment is 214 students, the larger proportion being from Colorado.

Harvard University.—The following appointments have been announced: As instructors, H. C. Boynton in metallurgy, W. E. McClintock in highway engineering, and M. A. Read in physiography. Assistants appointed for the year are: P. R. Curtis in ore-dressing and assaying; R. C. Wells in physical chemistry; W. B. Updegraph and D. W. Howes in mechanical drawing; W. M. Gregory in paleontology and A. P. Larrabee in zoology. The following have been appointed to Austin teaching fellowships: L. J. Cole, zoology; J. M. Fox in mining and metallurgy, and F. W. Russe in organic chemistry.

INDUSTRIAL NOTES.

The Hazard Manufacturing Company, of Wilkes-Barre, Pa., has secured a contract for telephone wire for shipment to Japan.

The Chicago Pneumatic Tool Company has secured a substantial Mexican contract through Isaac M. Hutcheson, of Mexico City.

The Nordberg Manufacturing Company, Milwaukee, Wis., has let contracts for an extension to the machine shop of 100 by 220 ft., to be erected before May 6.

Westinghouse, Church, Kerr & Co., through their New York office, have been given a contract for gas engines by D. P. Zacharias, of Athens, Greece, for installation in an electric lighting plant there.

Phoenix Iron Works at Portland, Ore., has its plant installed in a new building, and is adding machinery preparatory to building mining appliances. The plant was destroyed by fire, with a heavy loss, about one year ago.

The Robb Engineering Company, of Amherst, N. S., recently secured an order from the Nova Scotia Steel Company to build 2 vertical engines of marine type, and of 600 h.p., to be used at Sydney mines for electric lighting.

The Vandalia Mine in El Dorado County, Cal., has just installed a steam boiler to run the new burners installed in its rotary dryers. The Wilgus Manufacturing Company, of San Francisco, supplied and installed the burners.

The Salt Lake, Utah, Hardware Company is to furnish the Latham Mining Company for its properties in the Spruce Mountain District, Nev., a new hoisting plant and machinery sufficient for the equipment of a 50-ton concentrating mill.

The St. Louis Chemical Company, of St. Louis, Mich., has just received 1,000 tons of iron pyrites from Spain, a small portion of the 16,000 tons which the firm expects to use annually. It will start its plant in a very short time.

The Stanley Electric Manufacturing Company has sold the Indianapolis, Columbus & Southern Railway Company the following apparatus: 48 Type No. 402 railway motors, 1 500-kw. revolving field generator, 1 300-kw. rotary converter, 3 110-kw. and 3 150-kw. transformers and the necessary switchboard apparatus.

There are four blast furnaces under construction in Alabama that will be ready before the end of this year. The Alabama Steel and Iron Company has one at Gadsden; the Alabama Consolidated Coal and Iron Company one at Gadsden; the Lookout Mountain Iron Company one at Batelle, and the Central Iron Company one near Tuskaloosa.

The Christensen Engineering Company, of Milwaukee, Wis., will soon begin the erection of a $50,000 addition to its plant. The building will be 3 stories high and 201 by 66 ft. The outside walls will be hollow concrete blocks, the girders and columns in the interior according to the Ransome system of work and all the window sills will be of metal. No wood will be used.

The Worthington Pump Company, Limited, has been incorporated in London with a capital of $4,500,000, consisting of $2,000,000 in 5 per cent bonds and $2,500,000 in shares. The company acquires the European business of the Worthington and Blake companies in addition to others. Two factories will be erected, one in Germany and one in Russia. The directorate will be jointly American and English.

Among the orders recently received by the Burt Manufacturing Company for its Cross oil filters are a 50-gal. one for a large electric light plant at Mexico City, Mex.; 4 large ones to be used on steamers now being built by the Eastern Shipbuilding Company; 2 to be used in one of the pumping stations of the city of New York, the eighteenth order from the American Sheet Steel Company; 8 for San Francisco, 1 for Portugal, and the company's agent at Mexico City has just ordered 16.

The Westinghouse Electric and Manufacturing Company has secured a contract valued at nearly $3,000,000 for machinery to be utilized in connection with an extensive electric railway system to be constructed in Nicaragua by the Nicaragua & Transcontinental Railroad. The power to operate the road will be derived from a large hydraulic plant. The railroad company's offices are in Pittsburg, Pa., F. M. Latimer, of Pittsburg, being one of the prime movers in the project.

The Scranton Steam Pump Company, of Scranton, Pa., which recently added a large foundry to its plant, has secured the entire plant of the American Car and Machine Company, of Kingston, Pa., consisting of machine shop, foundry, forge room and pattern shop, which will be known as the Scranton Steam Pump Company, Wyoming Valley Branch. The new plant will make Lippincott steam separators, shaking grates, Union furnace blowers, and the smaller sizes of duplex pumps.

The Eastern Iron Company will soon have the blast furnace at Secaucus, N. J., idle since 1893, in operation. The plant has been modernized, and will be ready about May 1, to make foundry iron. The company will get its ores from mines recently bought of the Kearney Iron and Mining Company, comprising 250 acres of red hematite iron ore lands near Gouverneur, N. Y., with a daily capacity of 400 tons of ore. The capital stock of the Eastern Iron Company is $600,000. The officers are: President, Chas. Andrews; vice-president, Frederick Crane; secretary, S. L. Mershon; treasurer, J. M. Clark. The general manager is Albert Trinler, formerly manager of the National Steel Company's furnace at Sharon, Pa.

Plans are completed for the new shops of the Ingersoll-Sergeant Drill Company at Phillipsburg, N. J., including a pattern shop, 160 by 60 ft.; pattern storage house, 280 by 60 ft.; foundry, 500 by 160 ft.; office, 160 by 50 ft.; carpenter shop, 140 by 40 ft.; shipping house, 620 by 60 ft.; 2 buildings for building air compressors, 260 by 100 ft. each; an erecting building for air compressors, 320 by 120 ft.; power station, 150 by 100 ft.; oil treating department, 160 by 60 ft.; forge shop, 120 by 80 ft.; testing room, 60 by 30 ft.; warehouses, 160 by 60 ft. and 100 by 50 ft.; drill erecting shop, 160 by 50 ft.; drill repairing shop, 160 by 25 ft.; drill manufacturing shop, 325 by 160 ft.; tool department, 150 by 100 ft., and storeroom, 125 by 80 ft. The buildings are to be located on the Delaware, Lackawanna & Western Railroad.

The Chicago Pneumatic Tool Company reports an increase in exclusive contracts secured lately, giving it the right to furnish all the pneumatic appliances used by several large railroads and machine firms for a period of one or two years, as stipulated. These contracts were held up, in some cases, awaiting the result of patent litigation, but were placed with the company immediately upon the decision of the United States Court in favor of the Chicago Pneumatic Tool Company on the Moffet pneumatic tool patents. The following are a few of the firms that have purchased pneumatic machinery recently: Lake Shore & Michigan Southern Railroad (for the new Collingwood shops and various other points on the system); Wabash; Delaware & Hudson; Central Railroad of New Jersey; Cambria Steel Company, Johnstown, Pa.; Baldwin Locomotive Works, Philadelphia; American Bridge Company, Newark, N. J.; American Car and Foundry Company, Detroit, and Berwick, Pa. (exclusive contract for 1 year); Great Lakes Engineering Company, Detroit, Mich.; Lackawanna Steel Company, Buffalo, N. Y.; American Trading Company, New York, N. Y.; Brownville Iron Works, Brownville, N. Y.; Omaha Boiler Works, Omaha, Neb.; Boston Bridge Works, Boston, Mass.; Crerar Adams & Co., Chicago; Pennsylvania Company, Ft. Wayne, Ind.; American Locomotive Works, Scranton, Pa.; Erie Railway, Susquehanna, Pa.; Empire Granite and Marble Works, Jackson, Mich.

The Wellman-Seaver-Morgan Company, incorporated under Ohio laws, with $5,000,000 capital, is a consolidation of the Wellman-Seaver-Morgan Engineering Company, of Cleveland, and the Webster, Camp & Lane Company, of Akron, O. The Wellman-Seaver-Morgan Engineering Company recently completed an extensive plant in Cleveland. Its specialties are bessemer and open-hearth steel plants, rolling mills and machinery, metallurgical furnaces, steel buildings, ore and coal handling machinery, coke ovens, etc. The Webster, Camp & Lane Company, besides its original plant, has a modern plant at Akron, O., and makes a specialty of mining machinery, including hoisting and ore handling machinery. The new company will operate both of the plants. The general offices of the two companies will be in Cleveland, as will also the engineering departments. Steel castings and patterns will be made at the Cleveland plant, and the gray iron castings at Akron. The new company will control the Wellman furnace patents, and the Hulett unloader patents. The Cleveland concern will be known as the Wellman-Seaver-Morgan Engineering Division, and the Akron concern will be the Webster, Camp & Lane Division of the Wellman-Seaver-Morgan Company. The officers are: President, S. T. Wellman; chairman of board of directors, John McGregor; first vice-president, S. H. Pitkin; second vice-president, John W. Seaver; third vice-president, George H. Hulett; general manager, Charles H. Wellman; secretary, Thomas R. Morgan; treasurer, Albert D. Hatfield.

TRADE CATALOGUES.

"How to Pack Gas Engine Cylinder Heads" is an interesting leaflet, giving full directions for cutting a gasket, preparing the flange and applying the gasket. The methods described in the leaflet have been tested by years of experiment. Any one interested can secure a copy of the leaflet from the H. W. Johns-Manville Company, 100 William Street, New York, or from its branch offices in Milwaukee, St. Louis, Chicago, Pittsburg, Cleveland, New Orleans, Boston, Philadelphia and London.

The Kilbourne & Jacobs Manufacturing Company, which makes small cars of all kinds at its works at Columbus, O., has issued its car catalogue No. 32, describing briefly, with numerous excellent cuts, the company's mine and ore cars, contractor's dump cars, brick cars, anode cars, stone cars, tank cars, mine skips, etc. The cars are made for various gauges of track, either standard or narrow gauge, and the ore cars may be had fitted with the McCaskell wheels and axles. The catalogue is very complete, and will interest all who have to do with handling materials about mines, mills and factories or on plantations or in general contracting work.

Catalogue No. 14 A, issued by the Trenton Engineering and Machinery Company of Salt Lake City, Utah, describes the "Lucifer" roaster, for desulphurizing crushed or fine ore, concentrates or granulated mattes. The pamphlet states that with material containing 15 per cent or more of sulphur no firing is needed, the heat generated by the combustion of the sulphur being sufficient for roasting. The roaster is said to be adapted for drying or ordinary roasting, also for chloridizing roasting, for dead roasting or for volatilizing roasting. The roaster is of the circular, multiple hearth or McDougall type. The column and the rabble-arms are cooled by having very ample hollow passages through which air can be circulated, doing away with the difficulties of water circulation. No chains, wire rope, wheels, idlers or sprockets are employed. The driving gear is located at the top of the furnace and the column, with its arms and rabbles, can be raised or lowered without disturbing the driving gear or stopping the furnace. The rabbles are made so as to cover and protect the arms, yet are easily and quickly replaced. There are only two bearings, these are of the reservoir or self-oiling pattern fitted with friction rings or ball-bearings, and are outside of the furnace proper. The furnace is made in 12 sizes, from 8 to 24 ft. in diameter internally, and 23 to 38 ft. high externally, having a capacity on heavy sulphide ores of from 5 to 100 tons.

SPECIAL CORRESPONDENCE

Denver. April 11.

(From Our Special Correspondent.)

The General Assembly has adjourned without enacting the arbitrary 8-hour bill, which would have affected the smelting and ore treatment plants. On account of the increasing amount of low-grade ore now mined and treated at small profit, such a law, with resulting increased treatment charges, might have closed some large producers, employing considerable numbers of men. In view of the failure of the Legislature to act, although in the preceding election each political party had an 8-hour plank in its platform, it is within the range of probability that the Western Federation of Miners will now start an active campaign for unionizing mines and smelters, and will take other steps to force an 8-hour system, so that the matter is by no means settled until the assembling of the next legislature two years hence.

With reference to the publicity required of mining companies in England, recently mentioned by this Journal's London correspondent, the statutes of Colorado look to somewhat similar publicity, but are too often ignored. The Colorado statute requires that every corporation shall, within 60 days after January 1 in each year file an annual report with the Secretary of State, showing the names and addresses of its officers, directors or trustees; the amount of its capital stock, and the proportion actually paid in, whether in cash, by purchase of property, or otherwise; the amount of the indebtedness; whether or not it is engaged in the active operation of its business within Colorado, and such other information as will show with reasonable fullness and certainty the condition of its property and its financial condition.

A mining corporation must also state the amount of its properties within the State, and where situated; the amount patented or held by possessory right, and in general terms the amount of work done and improvements made since filing the previous report. Failure to comply makes all the offices and directors jointly and individually liable for all debts contracted during the year next preceding the time when such report should have been filed, and until filed.

Colorado, by reason of its position among the mineral producing States, has possibly the greatest number of questionable mining companies, some with headquarters in the Middle and Eastern States, selling stock through misleading literature, intended to victimize the unwary. Such companies rarely attempt to comply with the above statute, and the individual stockholders, holding comparatively small amounts, and scattered all over the Union, are often either not aware of the law or not in a position to employ legal help. In fact, the practical helplessness of the individual small stockholder is apparently presupposed by promoters.

Mr. William Weston has been examining coal fields and other mineral deposits in Grand and Routt counties, along the proposed route of the Denver, Northwestern & Pacific Railway, for a syndicate representing Eastern and foreign capital. In this work he has been assisted by the officials of the new road. Mr. Weston estimates the area of the Yampa coal field in Routt County at 900 square miles, though owing to snow he was only able to examine seams worked by farmers and other local residents for a domestic supply. No coal has been shipped to outside points, as the seams are from 50 to 100 miles from the nearest railroad. Mr. Weston says there is semi-bituminous, bituminous, semi-anthracite and anthracite coal, and the veins examined are from 5 to 15 ft. thick, the average thickness being about 8 ft. of clean coal. He brought 50 samples, from 14 localities, which were analyzed by Henry E. Wood & Co., of Denver. The average of the 14 analyses showed fixed carbon, 57 per cent; volatile matter, 35 per cent; ash, 4 per cent; moisture, 4 per cent. These samples came from near the surface. Further work will be carried on this summer by Mr. Weston and associates.

Los Angeles, April 8.

(From Our Special Correspondent.)

The Radcliff Mine, in Inyo County, Cal., is under bond to Snedaker & Co., of this city. About 25 men are employed, and recently some valuable ground has been opened up. L. H. Mitchel examined the mine for the parties securing the option.

Manager J. L. Turner, of the Leland Mine, in Boundary Cone District, Arizona, states he will start immediately to build a railroad 17 miles from the mines, to a point on the Colorado River, opposite Needles, Cal. He states the ties, rails and rolling stock are already purchased. He will also install a large plant at the river to pump water to the mine for milling and camp purposes. The late developments at the mine, he claims, will justify this very large expenditure of money.

The East Mine, located in Stockton Hill, Mohave County, Arizona, recently purchased by John Posey, Jr., of this city, is reported showing up well. The lower tunnel, 100 ft. long, disclosed a vein 4 ft. wide with gold values. Development is to be pushed.

H. B. Starbid, lessee and manager of the Rose Mine, near Victor, Cal., reports the mine looking well. Shipments of high-grade ore go regularly to the Selby Smelter, and a large tonnage of fair grade is on hand at the mill ready for reduction. The mill will start June 1. Fourteen miners are employed.

The recent arrests or convictions of some notorious promoters in the East for foisting worthless mining schemes and making false statements in mining prospectuses have had no perceptible effect in this section. Recent posters, advertisements and prospectuses containing statements absolutely unreliable, regarding properties in Arizona and Sonora are in evidence here. Just a few thousand shares of stock to sell to build a pipe line, concentrator, stamp mill or furnace is the cry. Similar schemes last season that were described in half and full-page advertisements are now seldom heard of. The promised dividends have not yet materialized.

Los Angeles men are building a 100-ton dry crushing cyaniding plant on the Ester group of mines, near Mohave, Cal. Llewellen Brothers, of this city, have contracted to furnish all machinery within 90 days.

San Francisco. April 8.

(From Our Special Correspondent.)

In the Sierra Nevada Mountains there are about 12 ft. of snow, and in the canyons snow is deeper still. Miners in all the northern counties should have water far into the fall or until the rains begin again; in Tuolumne County, where for some years they have stopped work a couple of months each season, they will be able to continue uninterruptedly.

The Western Federation of Miners has already formed six or seven new unions in Tuolumne County, one of the Mother Lode counties, and a few unions in Amador County. At the Bunker Hill Mine in the latter county a new 20-stamp mill was contracted for recently, with an option for 20 more stamps at same price, from a San Francisco firm, but word has been sent to hold the order pending further instructions. If the owners are compelled to pay higher wages with shorter hours they will decline to make the investment. At the Mountain Copper Company's plant at Keswick there are now 260 men at the mine and 390 at the smelters. One more smelter has blown in and the converters started. Still Manager Lewis T. Wright is having trouble to get as many men as he needs. About 150 of the old employees have signed a public statement that the company has never discriminated against any workman on account of his affiliations, and that the five men discharged (about whom the Western Federation began trouble) had been on a continuous spree. The citizens generally side with the company.

At Oroville, Butte County, there are now 22 mining dredges at work, and 6 more are being built. The bottom gravel is free from cement and carries from 30 to 40c. per cu. yd. in gold. The land when bought for farming and fruit raising, cost about $75 per acre, but cannot be purchased now for less than $1,000 per acre, for mining. This amounts to about .2 cent per cu. yd. of ground, which costs about 4c. to work. The dredgers of the bucket type cost from $60,000 to $65,000, handle about 2,000 tons of gravel daily, and are making money fast.

San Francisco has a new stock exchange, organized this week. It is called the San Francisco and Tonopah Mining Exchange, and already has 52 members at $50 each on its charter roll. The limit of membership is to be 100. Those interested aver that Tonopah, Nev., will in time eclipse the famous Comstock mines. Most of the old mines there are now "assessment stocks," and it is hoped that Tonopah will give dividend stocks, but if the Tonopah mines are run on the same basis as the old Comstock mines the results will doubtless be about the same.

Grass Valley, Nevada County, feels happy over the results of last year's work in the North Star Mine, as shown by the report of the president, James D. Hague. The mine has developed very good ore in the eastern part, between the 1,100 and 1,900-ft. levels. The ore-body is about 100 ft. long, from 3 to 5 ft. thick, and has been yielding about $40 per ton. From this ore-body the company last year got out 7,204 tons, yielding $315,272 ($43.76 per ton) at a cost of $68,306 (or $9.48 per ton), and a profit of $246,966 (or $34.28 per ton). This shows a profit of about $15 per sq. ft. of area worked. From the Central shaft the company took out $95,875 from 10,195 tons of ore, but the profit was only $9,954, or 97c. per ton. The total values produced by the mine last year were $411,147, with operating cost of $154,227, and profit of $256,920. The North Star from its reorganization in 1884 to end of 1902 has yielded $4,250,000, and the total production of the mines now belonging to the company, may be estimated at about $17,000,000. The old Allison Ranch Mine has not paid since its reopening, though a very large sum has been spent in development and equipment. The machinery is modern, but will be sold as the company has decided to abandon trying to make a new mine out of an old one.

The bond on the Bagdad mines at Ludlow, San Bernardino County, has expired, and the company will retain the property. The mill at Barstow is to be overhauled and put in order by E. H. Stagg, the manager.

The litigation over the Balaklala mines, Shasta County, has ended and Peter Kimberley, of Pennsylvania, will probably make the payments on the bond and proceed to develop the property. Those who were contesting title have compromised, and will let the sale go on.

There has been some little local excitement over the finding of placers near Needles, San Bernardino County, and some considerable gold dust and nuggets have been taken out. The ground has all been taken up, mostly by those who first found the camp. Another new placer field is 45 miles from Ibex, in the same county, near Black's Peak, and hundreds of men have gone in.

San Luis Potosi, Mex. April 7.

(From Our Special Correspondent.)

During some recent repairs to one of the old patios in Guanajuato, the color of the ground underneath attracted attention, and some assays were made, and finally shipments were begun. A number of car-loads were sent out, the rich spots in places reaching a depth of over 10 ft., while settlements gave an average of about $30 per ton. This find has led to the speculation as to what there may be under these old patios in Mexico, and to the possibilities for the Guanajuato River, into which the tailings from these patios have been going for centuries. Concessions have been obtained from Guanajuato almost all of the way to Silao, a distance of 15 miles, by George W. Bryant, of Guanajuato, manager of La Luz mines, and representing George Peck, and a number of other capitalists of Colorado Springs, who are operating in Guanajuato. Mr. Bryant has been sampling the river for some time, finding values from $8 to $14 to the ton. This past winter some San Francisco people have been with Mr. Bryant, taking samples and making experiments to learn the most economical method of working. The results have not been made public.

Though the returns of the Greene Consolidated Copper Company, of Cananea, Sonora, in the way of dividends may not be up to expectations, and are rather small for the amount of capital invested, yet the amount of work going on there and the present large output of copper have helped to build up a modern city of over 10,000 people. However, the great copper deposits of Sonora are not limited to the Cananea District, for the Yaqui Copper Company is operating on a large scale at the Campo Santo Nino, near Minas Prietas. About 5 miles northwest of La Dura District, in the Yaqui country, J. MacCullom and J. L. Sheppard are working a newly discovered vein, high in oxide and carbonate of copper, which they call El Creston de Cobre. The Hidalgo Mining Company, organized under the laws of Arizona, is working copper properties of about 80 pertinencias, about 6 miles west of the Phelps, Dodge mines at Nacozari, and 70 miles south of the border. John R. Hooper is exploiting a copper vein at Soyopa, and the El Majin Copper Company, of Hermosillo, besides others, is preparing to begin work. The Gold Treasure Mines Company is working in the San Jose Mountains, and building a new road to its properties. The Santa Fe Gold Mining Company has bought ground near Alamos for the construction of a smelter. The Chicago & Sonora Gold Placer Mining Company is building a dredge for placer work on the Yaqui River, near Suaqui Grande, and a stamp mill is being installed at Mina Blanca, close by. The Indiana Mining and Improvement Company, with $200,000 capital, is developing gold properties in northern Sonora. F. J. Transaint, of Milwaukee, is operating some rich old mines in the Auspi District, near Heupaca. Much new work is being carried on in the San Javier District, southeast of Hermosillo. The Lucky Tiger Mining Company, $650,000 capital, with J. M. Graham, of Bisbee, Arizona, as president, and J. K. Davidson, St. Louis, Mo., as vice-president, is working gold claims just over the line from Douglas, Ariz. J. A. Singley has bought the San Blas Mine, in the Altar District. The Nogales Copper Company has bought the Cerro Prieto mines, 35 miles east of Magdelena, for $600,000; and the La Barranca coal mines are furnishing coal to the smelter. For railroad facilities in Sonora a number of concessions have been consolidated into what will be known as the Cananea, Yaqui River & Pacific Railroad to run from Naco, Ariz., through Cananea (this part is in operation) to San Marcial, the mouth of the Yaqui River, and the coast towns of Agiabampo or Topolobampo, the latter the Pacific terminal of the Kansas City, Mexico & Orient Railroad, with branches to Nacozari, Zahuaripa, and a connection with the Sonora Railway. The investments in the State of Sonora represent $30,000,000 of American capital, and probably no other State in the Republic is being so thoroughly prospected, perhaps due to the fact that the Yaqui Indians are now practically subdued by the Mexican Government.

The mines of Guanajuato are in a flourishing condition. The Sirena and El Carmen continue large shipments, and of the smaller mines the Cedro, with over $30,000 in undivided profits in the treasury, is adding several thousands to this surplus every week. This mine is principally owned by the Dwight Furness Company, one of the largest companies operating in the State of Guanajuato. Among the Furness Company's other interests is the large ranch of El Fuerte, near Ocotlan, Jalisco, on Lake Chapala, and the Calabaza Mine at Etzatlan, Jalisco, 60 miles west of Guadalajara. This property is the only large lead mine in that vicinity, and under W. N. Cummings, the company's general superintendent of mines, some fine bodies of galena, and of zinc blende, have been uncovered ,and the strength of the Calabaza vein proven. The extension of this vein to the east runs through the San Pedro and Nil Pesos properties, for which New York men are negotiating. To the south of the Calabaza Mine, about 3 miles, is the old Santo Domingo Mine, from which large quantities of ore have been taken in years past. This is now held under option for $250,000 by some Americans. North of Etzatlan, about 50 miles, is the remarkable Hostotopaquilla, with its intricate vein systems. To the west of Etzatlan are the districts of Ixtlan, Tepic and many others, which await the building of the Mexican Central's branch road from San Marcos, 8 miles west of Etzatlan, to San Blas, on the Pacific Coast. In this Tepic country American investments are just beginning. New machinery is being taken into Tepic by Messrs. Hunter and Akers, and to Santiago by Charles Griggsby. Negotiations are pending with John Bradbury for rich ground, near Santiago, and with Ruperto Ambriz, of Tepic, for the Espiritu Santo mines, near Compostela. Southeast from Etzatlan, in the vicinity of Ameca, there is much activity. Mr. G. E. McCormack, of Ameca, has a large body of copper ore, just outside of town. Others are making rich finds in gold and copper at Ayutla, Talpa and Mascota.

Exchange on New York has again shown a little improvement, the average for the past week being at 261. Among mining stocks Dos Estrellas, of El Oro, continues to be the most sought after, going from $2,070 of the week before to $2,200 this past week. Of other stocks the Torreon Metallurgical Company, with another dividend of $20 paid April 1, was selling at $248; Monterey Iron and Steel has gone to $125; Cinco Senores to $200; Hacienda de La Luz, Pachuca,

to $300; Santa Maria de La Paz, Matehuala, steady at $770; Soledad at $370; Sorpresa, $315; Amistad y Concordia at $77; San Rafael y Anexas at $1,050; and La Esperanza, with dividend No. 78 of $10 paid April 1, at $1,200.

London. April 4.

(From Our Special Correspondent.)

The Etruscan Copper Estates, Limited, continues to occupy a large share of attention in mining circles. Three weeks ago I mentioned that there was a revival of interest, owing to the impending issue of the report for 1902. This report is now published, and yesterday the meeting of shareholders was held. The report is very voluminous, and the speeches of the directors at the meeting were lengthy. The directors, and all in the employ of the company, continue to have unabated confidence in the property, and the shareholders are equally enthusiastic. The position is an unusual one. It will be remembered that the company was formed two years ago to acquire old mines in Italy opposite the island of Elba. They are situated in the mining district between Grosseto and Leghorn, and they have been thoroughly well known to local mining people for many years. Twenty years ago an English company was formed to acquire and work them, and such eminent mining men as Mr. R. W. Rickard and Mr. George Henwood reported on them favorably. For some reason, record of which I do not happen to have, the flotation was not a success, and the deal fell through. Subsequently other parties looked over the properties from time to time, but as the reports by the engineers sent out by them were not very favorable, nothing was done in the way of development. Finally, the promoters of the Etruscan Copper Estates took up the property and floated it with a capital of £575,000, to which must be added debentures amounting to £200,000. Twenty years ago, when the properties were unsuccessfully offered to the public, the capital was fixed at only £60,000, a much more modest and reasonable proposal, considering the nature of the ores. When the debentures were issued, certain groups in the city, who contemplated taking an interest, variously requested Mr. Alexander Hill, Mr. Moreing and Mr. R. J. Frecheville to examine the mines on their behalf. These three gentlemen agreed in advising their clients not to invest money in them, and Mr. Moreing even made fun of the mines and of the efforts of the directors and mining engineers in developing them, using such expressions as "opera bouffe" mining. The directors and shareholders, however, took no notice of these adverse reports, and as they had plenty of working capital in hand, have preferred to spend it in developments. The adverse reports have naturally tended to depress the market value of the shares, and the directors have determined to prosecute Mr. Moreing for libel in consequence, claiming £520,000 damages, this being the amount by which, they claim, the total market value of the shares was depressed by Mr. Moreing's report. The City looks forward with interest and amusement to the trial of this action. The divergence of opinion with regard to the properties on the part of various professional men is indeed remarkable, but, without prejudice to the parties concerned, it should be pointed out that the present favorable reports come from people interested in the working of the properties one way or the other, while Mr. Hill, Mr. Moreing and Mr. Frecheville, who gave adverse reports, were quite independent people. In some quarters the usual claptrap is talked, alleging that these three gentlemen were in the pay of the bears. I would willingly be silent on this point, but it is not right to sit idly by without a protest when mining engineers of repute have such insinuations made against them. As regards the mine itself, it is possible, by reading the directors' reports closely, to see that the ore is present in quantities over a large area. Here and there the ore is rich, but the average is comparatively lean, while pyrite, blende and galena are often mixed in a way that gives trouble in concentration or separation. Fortunately, both directors and shareholders understand exactly the position, that the proposition is a risk, and they deserve credit for their courage in taking a blind plunge.

The mining markets have been very quiet all week, and no movements are to be recorded. Some interest has been aroused by gossip that has been freely circulated with regard to the intentions of certain African houses to have an exchange for themselves. It has been a matter of public notoriety for years that promoters of mining companies have been subject to the dictation of the stock broker, and have been heavily shackled in consequence. There have been many threats to take away the South African business from the Stock Exchange, but nobody has felt strong enough to do it, so far. I do not know whether the change would be to the advantage of the public. Possibly, if the African houses had a mining exchange of their own, the benefits accruing would not go to the investor. A definite statement on the subject is promised shortly.

During the past few months the only activity in South African shares has been among those connected with the far east section of the Rand, but this week the results of boring in the western end have attracted attention also. The Western Rand Estates Company, owning property in the direction of Krugersdorp, has met with a reef at 2,000 ft., measuring 17 ins. wide, and said to assay 5 oz. The geology of the reef is not fully ascertained, nor do the directors rely on the phenomenally rich assay. Further news is anxiously awaited. In the meantime, there is considerable activity in the shares and in shares of companies owning property in the western portion of the Rand.

Last week I recorded the success attained by the Great Boulder Perseverance, Mr. Frank Gardner's West Australian leading line. This week it is announced that he is now going to reorganize his other companies—the Boulder Bonanza and the Great Boulder South. These companies have already spent a good deal of money, but hitherto no permanent orebodies have been discovered. The scheme now is to amalgamate with a liability, and to conduct further development. Under the management of Mr. Ralph Nichols this should be a promising venture, and the fact that Mr. Gardner himself is a large shareholder in each company lends confidence to the undertaking.

GENERAL MINING NEWS.

Mineral Oil Exports.—In March the United States exports were as follows, in gallons: Crude oil, 10,205,000; naphthas, 326,866; illuminating, 43,535,587; lubricating and paraffin, 8,719,311; residuum, 45,864; total, 62,832,628, against 87,432,293 gals. in the same month last year; showing a decrease of 24,599,665 gals., or about 28 per cent., principally in illuminating oil for the British and German markets. Exports in the 3 months ending March 31 aggregated 189,842,290 gals., which, compared with the corresponding period last year, shows a falling off equal to 56,643,122 gals., or about 23 per cent.

Chesapeake & Ohio Railway Company.—Coal and coke shipments in February and the 8 months of the fiscal year beginning July 1, are officially reported as follows, in short tons:

	February.	8 months.
Coal:		
New River	248,307	1,245,873
Kanawha	122,025	656,911
Kentucky	16,626	78,588
	386,958	1,981,372
From connections	11,741	118,179
Total coal	398,699	2,099,551
Total, 1902	477,742	3,802,725
Coke:		
New River	27,868	181,919
Kanawha	12,751	43,676
	40,619	225,595
From connections	.....	2,266
Total coke	40,619	227,861
Total, 1902	37,934	314,541
Grand total, 1903	439,318	2,327,412
Grand total, 1902	515,676	4,117,266

The smaller shipments this year are credited principally to New River coal for tidewater points.

Pennsylvania Railroad Company.—Shipments of coal and coke east of Pittsburg and Erie in the week ending April 4, and for the current year, are officially reported as follows, in short tons:

	Week	Since Jan. 1.
Anthracite	72,923	1,189,743
Bituminous	550,314	6,928,506
Coke	201,593	2,438,825
Total	824,830	10,557,074

Compared with last year the shipments since January 1 show increases of 91,948 tons anthracite, 872,634 tons bituminous, and 60,333 tons coke, making a total increase of 1,024,915 tons, or 10.7 per cent.

ARIZONA.

GRAHAM COUNTY.

Arizona Copper Company.—The company reports that the production at Clifton in March was 1,463 short tons of copper.

Shannon Copper Company.—This company's new plant at Clifton, consisting of 18 Frue vanners, has started operating.

(From Our Special Correspondent.)

Chapperal Group.—This group of copper claims, on Pinto Creek, is reported bonded for 1 year to the Pinto Creek Copper Company for $35,000.

Johanna.—This claim, at Metcalf, has been sold to L. H. Mitchell.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Leland.—The company owning this mine at Spear's Lake is rushing work on the new mill.

Manitowoc.—George W. Jonas, manager of this mine in the Chimehuevis Mountains, has let a contract for sinking 100 ft.

Oro Plata.—The new Ellspass mill at this mien in Todd Basin is reported doing good work. The mine will be unwatered as soon as the steam pump is put in.

YAVAPAI COUNTY.

(From Our Special Correspondent.)

Poland.—This mill, at Prescott, has closed down, throwing 100 men out of work, principally because of the 8-hour law passed by the last Legislature.

CALIFORNIA.

Martel Mining Company.—This company is about to open the magnesite deposit at Red Mountain, in the corner of Alameda, Stanislaus and Santa Clara counties. The officers of the company are: H. Eppinger, president; H. C. Stillman, vice-president; F. Dassonville, secretary, and G. W. Reed, treasurer. The offices are in the Hayward Building, San Francisco. The location of calcining works is not yet determined. Considerable road building must be done before rock can be readily shipped, as the deposits are about 19 miles from Vernalis, the railroad station. Work has started on the road. The deposits are said to be the largest in the State. There is little local demand and a mine at Porterville, Tulare County, is the only producer. The new company will probably ship to Pittsburg, Pa.

AMADOR COUNTY.

Emmons.—John J. Cranmer has bonded this mine, near Pine Grove, and development is to start at once.

Kennedy Mining Company.—Although this mine at Jackson, J. F. Parks superintendent, is a large producer, the company has been compelled to levy a $1 assessment to meet the recent judgment secured by the Argonaut Mining Company. Moreover, very expensive work has been done at the East shaft.

Porteous.—This mine, adjoining the Horn, near Defender, has been sold to eorge W. Horn and G. S. Andrews.

Sargent.—This mine, near Middle Bar, is given up by the holders of the bond and the machinery is to be sold. There was danger of tapping the old workings of the Hardenburgh Mine adjoining, and prospecting was unsatisfactory.

CALAVERAS COUNTY.

Banner.—At this gravel mine, near El Dorado, D. P. Gray, who holds the option, has 10 men busy grading for the new machinery. A hoist and a mill are to be put up.

Calaveritas.—At this mine, at Calaveritas, F. A. Gourley is superintendent in place of J. J. McSorley, resigned.

Gray Wing Mining Company.—This company, of Folsom, has purchased gravel claim in this county. The new claim is to be worked by the El Rio Gravel Mining Company, composed of Gray Wing stockholders.

Rooney.—The gallows frame for this gravel mine at Chile Gulch, is completed. The mine is being opened by T. H. Rooney.

EL DORADO COUNTY.

Snow Brothers are about to open some deep gravel deposits at Diamond Springs, and will conduct water for hydraulicking across Webber Creek from Sacramento Hill.

Gold Top.—Action has been started by D. T. Loughborough against Mary Purcell for the partition and sale of this quartz mine, near Aurum.

Monte Milling and Mining Company.—This company has been organized to develop the Del Monte quartz mine, near Coloma. The office is in Sacramento and the directors are Bruce McBeath, J. D. Lockhart, H. G. Lockhart and Chauncey Dunn. A 10-stamp mill is to be erected.

FRESNO COUNTY.

Copper King.—Labor liens on the mine at Clovis are being paid off, and the claims of the heavier creditors may be compromised.

Sycamore Creek.—The Fresno Placer Mining Company's claim is washing gravel. John March, George Ellis and William Terrill, of Fresno, have located a claim on the creek about 4 miles above its junction with Kings River. Lewis & Childers have located a quartz claim, and will put in machinery.

MARIPOSA COUNTY.

Austin Group Mining and Milling Company.—This company, of Whitlock, N. S. Trowbridge superintendent, has started work on the Ragan shaft and Whitlock Chief tunnel.

Dias.—This mine, on Bear Creek, Indian Gulch, has been bonded, and work may start shortly.

Mexican.—This mine, near Bear Valley, is being opened by Charles Adair and Henry Oyler.

Number Eight.—Harmon & Stevens, of San Francisco, have started men at work on the No. 8 and No. 9 mines at Hornitos, that the property may be examined by Eastern men.

MONO COUNTY.

Crystal Lake.—The tunnel at this mine at Lundy, R. T. Pierce manager, will tap the ledge at 3,160 ft. A large flow of water has been met. The mill is dropping 20 stamps. There are 80 men employed.

NEVADA COUNTY.

Black Bear.—Rich rock has been found in this mine on Deer Creek, by D. B. Marwick, William Torpie and County Assessor Schroeder. The mine is worked through a tunnel.

Eddy.—A good ledge has been struck in this mine, near Nevada City. The owners are E. A. Moore, E. J. Morgan and W. W. Kirkham.

Grass Valley Consolidated.—This mine (formerly Electric) at Grass Valley, G. W. Root manager, has repaired its 15-stamp mill, put in a new hoist and pump, also an electric plant and a compressor. Work continues below ground. Some specimen ore has been taken out, and a night shift put on.

Ironclad.—This mine, at Rough and Ready, Ed. Morgan superintendent, is running a 2-stamp mill with good results.

North Star.—The heaviest compressor in the State is being erected at this mine, at Grass Valley. It was built by the Union Iron Works, of San Francisco. The flywheel weighs 14 tons, and the machine is capable of developing 300 h.p. The shaft is now 2,500 ft. deep.

Perrin.—At this mine, at Grass Valley, owned by the New York-Grass Valley Consolidated Mining Company, George W. Root manager, the pumps are unwatering the levels. An 80-ton Merrals mill is to be erected.

Posey.—This mine, at Nevada City, has closed down temporarily, owing to a break in the new compressor.

PLACER COUNTY.

Annie Laurie.—Mr. Russelpl, who had the bond on this mine near Colfax, has concluded to take the property and will soon have 30 men at work.

Crosby.—This mine has recently been shipping ore to the smelter. Some of it has run over $40 per ton.

PLUMAS COUNTY.

Green Mountain.—Twenty-five men are cleaning out the old tunnels, etc., in this mine, near Crescent Mills, to get the property in shape for examination with a view to purchase.

SAN DIEGO COUNTY.

Himalaya Mining Company.—A deed filed with the county recorder shows that this company, mining for turquoise and tourmaline, has turned over its holdings to the North American Trust Company in order to issue first mortgage 6 per cent 25-year bonds. The total issue is to be $250,000.

SHASTA COUNTY.

Balaklala.—This copper property, in Flat Creek District, includes 60 claims under bond to the Western Exploration Company. The ore-body is large but low grade. It is expected that work on a smelter will soon start. Peter Kimberley, of Sharon, Pa., is largely interested.

Bully Hill Copper Mining and Smelting Company.—General Manager John B. Keating, of this company at Winthrop, says that the negotiations between Capt. De La Mar and the Mount Shasta Mine Company, pending some months, are off, and the Bully Hill mines will continue work without change of ownership. A strike of rich ore is reported in the 570-ft. level of the Bully Hill. The smelter has not started again, though there is plenty of ore, flux and fuel at hand.

SISKIYOU COUNTY.

Cherry Hill.—The lower tunnel on this mine, at Cherry Creek, is in 1,900 ft., and may strike the ledge any day. Twenty men are at work.

Knownothing.—From a lease on this mine, at Gilta, J. C. Roberts and I. Mitchell are taking out good ore, and working it in an arrastra.

Morrison & Carlock.—New buildings have been put up at this mine, near Fort Jones, J. H. Morrison superintendent, to replace those recently burned.

SONOMA COUNTY.

Culver-Baer Quicksilver Mining Company.—This company, of Santa Rosa, has elected the following directors: D. C. Page, A. V. McNab, G. B. Baer, E. M. Cox and I. E. Shaw.

TRINITY COUNTY.

Chonchilula Mining Company.—This company has been organized to work mines in the Chonchilula District. P. M. Paulsen, of Weaverville, is one of the local directors, Mark W. Musgrove is president, and W. T. Wintemuts secretary.

Lappin.—A strike of good ore is reported in this mine at Deadwood, Thomas Reynolds superintendent. The mine is now under bond to the J. J. Chambers Company, of Redding.

Yellowstone Gold Mining Company.—This company has been organized to work the Yellowstone Mine in East Fork District, now under bond to John H. Gill, of New York.

TUOLUMNE COUNTY.

App.—Capt. W. A. Nevills, owner of this mine, at Jamestown, intends adding 40 stamps to the mill. Large ore bodies have been cut on the 1,100-ft. level.

Big Creek Mining Company.—This company, near Groveland, E. H. Wiley manager and John R. Watson superintendent, is now confining work to the Justice claim. The company owns 80 acres of patented land and 14 claims.

Cosmopolite.—This mine, near Groveland, has been sold to Josiah M. Merrell.

Dutch.—At this mine, near Quartz, A. Trittenbach superintendent, miners on the 13th level have struck the ore shoot which paid so well on the levels above.

Laura Consolidated.—At this mine, near Cherokee, Superintendent C. L. Lang will soon have 40 men at work.

Little Beauty.—This mine, at Carters, is being reopened by E. McDow and Henry Cullers.

Little Bonanza.—The lessees of this mine, an easterly extension of the Bonanza Mine at Sonora, have struck a very rich pocket. The lessees are Bert and Arthur Deleray, A. A. Grant and D. R. Oliver.

Mount Jefferson.—Sulphurets are being shipped from this mine to the smelter at Everett, Wash., but as soon as the new cyanide plant is completed the sulphurets will be worked at the mine.

Nat Clark.—This gravel mine, near Sonora, has been sold to Estee & Stanford at a reported price of $22,000. Work will be resumed at once by the new management.

Nonpareil.—This mine, near Groveland, is being thoroughly exploited by those holding the bond and a test run on 500 tons of ore is to be made.

Rawhide.—At this mine, near Jamestown, owned by W. A. Nevills, the sulphurets will be treated by cyanide instead of by chlorination, as in the past.

Star King.—Operations have been resumed at this mine, near Carters, C. A. Holland superintendent, after two years' idleness. The ledge is small, but quite rich.

Woodside.—The price paid by W. S. Estey for this river gravel digging, near Columbia, is reported as $75,000. The new management will put more men at work.

COLORADO.

BOULDER COUNTY.

Ben C. Lowell.—A good strike is reported on this porperty at Magnolia, 8 miles from Boulder, now being unwatered, and regular shipments will soon start. Messrs. Cheney and Hirshfield, of Boulder, are the operators.

Boulder Gold Mining Company.—This company was recently incorporated in St. Paul, Minn., to work the Ellen group of claims in Springdale District, operated for several years by the Keller Brothers. A. M. Wells, of St. Paul, is president, and A. W. Keller, of Springdale, secretary of the company.

Don Pedro Tunnel, Mining and Milling Company.—This new company, organized to work several promising claims at Springdale, has driven a tunnel 300 ft. The tunnel will be run so as to cut a 12-ft. ore shoot traced on the surface. Smith & Hertzel, of Springdale, are in charge of the work.

Glendale Mill.—This custom mill of 15 stamps is being erected on Left Hand Creek, near Glendale, by D. L. Risley and others, of Pittsburg, Pa. The plant is that of the abandoned Gray Eagle Mill at Rowena.

Romance.—This old mine in Springdale District is being worked again by Winchester & Wilson under lease. They will sink the shaft to the level of the Longfellow lode. W. Sibrant is the owner.

Utica.—This property, at Ward, is being opened by drifts on the 650-ft. level. The plant has been overhauled and the mill is in good shape. The mine is operated by the Utica Mine and Milling Company. G. A. Davidson is manager and superintendent.

CUSTER COUNTY.

Bonanza.—Work on this group of claims, near Ilse, has been resumed.

Reveille.—At this mine, near Ilse, the shaft has been unwatered, and 15 men are busy underground.

Terrible.—At this mine, near Ilse, a large force of men is installing machinery for the new reduction works. The shaft is down 250 ft., and will be deepened.

GILPIN COUNTY.

(From Our Special Correspondent.)

Aduddell.—It is reported that Boston parties represented by Dr. Keith, secretary of the International Trust Company, have purchased this property in Russell District, and intend to work it through the Newhouse Tunnel. The reported price is $65,000. The Aduddell is known as one of the largest veins in the county, and the ore ought to make an excellent concentrating proposition for proper methods. Water, on account of the Newhouse Tunnel, is no more a handicap.

Delmonico Gold Mining Company.—This company is erecting a concentrating plant on Quartz Hill, and expects to utilize the mine water for milling. The main building will be 36 by 70 ft., and the plant will have a daily capacity of 50 tons. E. Steffan, Central City, is manager.

Fostoria Gold Mining Company.—A second payment of $10,000 has been made by Ohio, Indiana and Colorado parties who purchased about 3 months ago the large group of claims known as the Hall Ranch in Pleasant Valley District. A 30-h.p. boiler and pump are being installed, and an air compressor has been ordered. Sinking is to be resumed at once, and the shaft will go to 200 ft., when cross-cutting will start to cut the Brooklyn and New York claims, which were rich on surface. The company is also giving contracts for the erection of buildings, and intends to work on a large scale. Bruce M. Myers, Central City, is manager.

Gregory-Buell Consolidated Gold Mining and Milling Company.—This company is installing a Norwalk 6-drill compressor at the Buell property, near Central City, and proposes to carry out active work. The company has a force of men in its Gregory workings, and regular shipments are kept up to the stamp mills and sampling works, the smelting ores being of very satisfactory grade. The company may erect its own mill.

Pine District.—In this section, 6 miles west of Central City, C. S. Palmer, of Kansas City, Mo., has purchased the Sarah Jane property, and is cleaning out the tunnel 450 ft. long. The breast shows ore assaying between $20 and $25 per ton. Omaha (Neb.) parties have taken a lease and bond for $100,000 on the Hiatt group of 61 lode claims on Michigan Hill, and are preparing for regular developments. The Boston-Occidental Mining Company is erecting an experimental plant costing over $20,000 to treat the ores of its Mascot group on Colorado Hill. C. S. Ripley, of Apex, is manager. The Josephine Mining and Milling Company and the Helen Gold Mining and Tunnel Company are both figuring on erecting their own milling plants during the summer, and Denver and Eastern parties, who are interested in the Palace Mining and Milling Company, operating on Silver Creek, have purchased water rights and a mill site, and may erect a mill. J. L. Mountz, of Apex, owner of the Mackey, is arranging to install machinery. Kansas City people have formed the Rainbow Gold Mining Company to operate the large Rainbow group in Sawmill Gulch, and intend to install machinery soon. Matt Clennon, of Apex, is in charge.

Two-Forty.—Boston parties have taken a lease and bond on this property in Russell District, and are arranging for a shaft building and machinery for sinking. Stephen Hoskin, Central City, will be in charge.

GUNNISON COUNTY.

Big Four.—These claims, near the head of Cement Creek, near Crested Butte, will be operated this season by the Tilden Mining Company, of Chicago, Ill. A silver-lead ore-body has been opened up. The ore will be brought out by pack train to the Oversteg siding.

Blistered Horn Tunnel Company.—This company, operating on West Gold Hill, near Tin Cup, owing to the condition of the roads, will not put in machinery until spring.

Colorado Smelting and Mining Company.—This company, A. E. Reynolds manager, is driving two tunnels near Pitkin, one into Terrible Mountain and one under Mineral Farm Basin. Both are in over 450 ft.

Davenport.—J. F. Berryhill is superintendent of the Davenport and Adair tunnels, near Vulcan. The Davenport Tunnel is in 1,050 ft., and has cut out several large low-grade veins of gold ore. The Adair is in 430 ft. A concentrating plant may be erected.

Headlight Mining Company.—This company has its shaft down 130 ft. Manager Ehlerding has installed a pumping plant.

LAKE COUNTY—LEADVILLE.

Western Mining Company.—It is said that this company, representing the mining interests of the Guggenheim Exploration Company, has absorbed the A. Y. & Minnie Mining and Milling Company, the Mahala Mining Company, the A. M. W. Mining Company, at Leadville, and Ute & Ulay Mining Company at Lake City, Hinsdale County, and the business for these various corporations will be transacted in the name of the new company. The A. M. W. represents the Adams Mining Company, Maid of Erin Silver Mining Company and Wolftone Consolidated Mining and Milling Company. Samuel D. Nicholson continues as manager. Simon Guggenheim is president of the Western Mining Company; W. W. Porter, secretary, and Mr. Julius Rodman, assistant secretary and treasurer. The headquarters are at 71 Broadway, New York City, with local offices in Leadville in the American National Bank Building.

(From Our Special Correspondent.)

Leadville Ore Output.—The production has averaged 2,300 tons daily of all classes of material. An increase in sulphides, lead and zinc, is noticeable while

the iron tonnage is still holding up. The zinc tonnage shows an increase, about 250 tons daily being shipped. The Moyer and New Home are increasing tonnage in iron.

Big Evans Mining Company.—Manager Howard Collins is figuring on a pumping plant at the 310-ft. level of No. 2 shaft prior to sinking 200 ft. deeper.

Diamond Gold Mines Company.—P. Morris Perot and C. S. Hebard, of Philadelphia, heavily interested in this combination, have been looking over the new strike, and are pleased with the showing, as ore has been opened sufficiently to admit shipping 100 tons daily as soon as the new hoist can be secured. It is possible that the Yak Tunnel will be run from the Ibex workings across the gulch into the Diamond Mine, which it would strike at a depth of 950 ft.

Last Chance.—This new Lake Park proposition has opened, under the direction of George Egger, a 20-ft. ore-body showing a 7-ft. pay streak, assaying 20 to 80 oz. silver, with a trace of gold.

Louisville Combination.—Hanifen & Reynolds, the new owners, are taking out zinciferous material and pushing work in new territory on the Ulster, Newton and Horseshoe ground, and expect to sink the Louisville shaft soon to the lower levels. All work is now above water level.

Pacific Mining Company.—On the Gopher claim, in Dewey District, some rich free gold has been taken out, part of it assaying $200 to the ton.

Park No. 2.—This property of the Adelaide Mining Company is worked under lessees headed by John McAllister, who have opened a new body of copper sulphides over 20 ft. thick. Shipments will be increased to the company's plant at Buena Vista.

T. L. Walsh.—Lessees on this Sugar Loaf property have opened a streak of rich silver ore, and will ship at once.

Triumph.—Lessees under T. J. Cash are developing this gold belt property.

SAN JUAN COUNTY.

(*From Our Special Correspondent.*)

Astor Mines Company.—This company has absorbed the Sioux Mining Company and the Wigwam Mining Company's holdings in Picayune Gulch, near Silverton, and will operate the properties this season. The company is preparing to erect a mill in the near future.

Bessie Group.—The Bessie-McKisson Gold Mines Company has been reorganized, and is now known as the Lake Shore Consolidated Gold Mining Company. The officers are Edward J. Cable, president; F. H. Evans, vice-president; L. V. McKisson, secretary-treasurer, and W. A. Ptolemy, superintendent. This company is operating the Bessie Group, near Silverton, driving 2 tunnels on the vein.

Boston-Auburn Company.—This company has leased its properties on Tower Mountain, near Silverton, to A. V. Shaw and A. W. Degenhart for a period of three years. The owners will build a tram for the lessees to the railroad at Middleton, three-quarters of a mile long.

Buro Bridge Tunnel.—Curry & Johnson, of Silverton, are driving a tunnel to cut the Brooklyn vein, The breast is in 175 ft., and the tunnel may cut the vein at any time.

Champion.—The vein has been exposed in the crosscut 800 ft. from the adit. It is much wider than in the upper workings, and the pay streak is from 12 to 18 ins. wide. The ore is principally gray copper.

Colorado Copper-Gold Mining Company.—This company's affairs have been satisfactorily settled and preparations are being made to resume work on the Crown Prince group in Prospect Basin, near Silverton. Developments consist of a 280-ft. tunnel, which tapped a shoot of copper.

Hammond Tunnel.—It is reported that this tunnel has cut the Tomboy vein, near Silverton, but that the strike is being kept secret, owing to pending litigation with owners of claims whose property the tunnel traverses.

North Star.—The recent influx of water at this Silverton property is under control, a pump having been moved over from the Notaway. The shaft will be cleared of water in a few days, and operations resumed.

Pride of the West.—Repairs have been made to the breast of the tunnel, which will be driven to the vein, a distance of 300 ft. The breast is now in 1,300 ft.

Royal Mining Company.—This Silverton company has resumed work. Drifting on the vein shows good ore. Shipments will not start until later in the season.

Ruby Basin Mining Company.—A rich strike of lead and zinc ore carrying gold and silver is reported from the December Claim, in Ruby Basin, near Silverton. The strike was made at the 1,100 ft. in the tunnel, and the vein averages 3 ft. wide.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Arequa Mill.—This mill, in Arequa Gulch, near Elkton, has been totally destroyed by fire this week. For some time the mill has been worked under a lease treating low-grade oxidized ores from a number of dumps. The mill was originally erected about 6 or 7 years ago as a cyanide mill, and was afterward enlarged and a chlorination plant added. A considerable portion of the Wild Horse dump has been run through the mill. The property is understood to have been well insured.

Gold Exploration Tunnel.—Work is being pushed, and good progress made. The breast is now in Enterprise ground. The tunnel was originally started by D. H. Moffat and associates, and afterwards sold to Eastern men. It is being run for drainage and transportation. J. M. Parfet, of Cripple Creek, is in charge. A number of lessees are working various properties through the tunnel.

Hildebrand.—Cross-cutting on the 400-ft. level is being pushed. A large amount of work has been done by Eastern men, but so far without finding ore in paying quantities. The property is on Grouse Mountain, near the Newell Tunnel. The new El Paso drainage tunnel passes near it.

Isabella Gold Mining Company.—This property has not started since being closed by the strike, and what will be done is not known. A number of rumors are heard.

Lincoln.—This property, near Gillette, has again begun work, and a small cyanide plant may be erected to treat the ore which is low grade. No ore of any amount has been shipped of late. The Gillett section has not been proven a good mineral district, but quite a little prospecting in a quiet way is now going on.

Portland Gold Mining Company.—The directors declared the usual quarterly dividend of 3c. per share. With this paid the company will have distributed to its stockholders $4,417,080. The mill is said to be doing very well, and everything is in good condition.

Stratton's Cripple Creek Mining and Development Company.—The Bull Hill property has been thrown open to lease and a large number of applications filed, in some cases several for the same ground. The Globe Hill property is also opened for lease. The contest over the will of the late W. S. Stratton has been compromised, the son, I. Harry Stratton, getting $350,000, and withdrawing his suit. With the leasing of the Stratton estate Bull Hill bids fair to be quite lively this summer.

Stratton's Independence, Limited.—It is rumored that the differences between this company and the Strong Gold Mining Company are to be settled out of court. This company asked for $1,750,000 damages alleged to be due for ore taken by the Strong Company from a vein that apexed on Independence ground. Very little has been heard about the suit lately.

IDAHO.

BLAINE COUNTY.

Minnie Moore.—The shaft house at this mine, near Hailey, is nearly rebuilt.

CASCADE COUNTY.

Castner Coal and Coke Company.—Patrick J. Shields, of Great Falls, Mont., has instituted a suit in the district court at Butte for a one-sixth interest in this company and its coal fields. The defendants in the action are: The Anaconda Copper Company, James B. Haggin and Margaret P. Daly, widow of the late Marcus Daly.

IDAHO COUNTY.

Lincoln.—The new concentrator at this mine, near Pearl, is reported handling 75 tons of ore daily. It is run by a 30-h.p. gasoline engine. The shaft is down 300 ft. John T. Hodson, of Salt Lake, Utah, is manager.

LEMHI COUNTY.

Ima Consolidated Mining Company.—The lower tunnel has been driven 260 ft., and is reported to show good values in gold, silver and copper. Salt Lake, Utah, men are interested, and A. Smith is superintendent. Electric drills are used.

ILLINOIS.

CHRISTIAN COUNTY.

Weaver Coal and Coke Company.—This company, recently secured the plant of the Springside Coal Mining Company, at Pana, and will make very heavy shipments from it. It also is developing the Nilwood Mine and adjoining property, near Springfield, on the Chicago & Alton Railroad. The Weaver Coal and Coke Company plants are under the supervision of John MacFadyen, chief engineer, formerly associated with the American Steel and Wire Company and the United States Steel Company. William Ramsay, formerly with the Frick Company, is in charge of the Illinois plants.

INDIANA.

(*From Our Special Correspondent.*)

F. M. Osbourne, representing a syndicate of Ohio men, has purchased 800 acres of coal lands at the corner of Greene, Clay and Sullivan counties on the Southern Indiana Railroad. The price paid was $40,000. The syndicate is composed almost wholly of Cleveland men. Columbus men have also invested many thousands of dollars in the same locality within the past year.

Indiana Coal Miners' Strike.—After more than a week's idleness and a loss of $142,500 in wages, the Indiana bituminous miners went to work on April 8. Under the new scale of wages the miners get an increase ranging from 12½ to 27 per cent. The scale affects 9,500 miners, giving an average of 31c. more a day in wages. The loss in output during the week's idleness amounted to 131,502 tons. The suspension was due to the demand that extra men be employed to fire shots in some of the Clinton mines. The question of shooters at these mines has been left to a commission composed of a miner, an operator and Prof. Robert Thurston, of Cornell University.

Oil Wells.—The output for the month of March was the largest recorded. There were 810,374 bbls. produced, and for the first quarter of the year 2,227,950 bbls., valued at $3,345,701. The largest production in the State comes from the Marion District in Grant County.

KENTUCKY.

Coal Miners' Wages.—The new scale for western Kentucky gives miners 87½c. for screened coal, an advance of 12½c. Track layers get $2.20; track layers' helpers, $2; trappers, 63c.; bottom cagers, $2; riders, $2; timberman, $2; pipemen, $2.11; all other inside day labor, $2. According to the new scale all outside day laborers will be paid at the rate of 12½ per cent above the old scale.

MARYLAND.

Cumberland Coal Miners' Wages.—Beginning April 1 miners in the George's Creek field received a voluntary increase of 10c. per ton, making the mining rate 65c.; drivers, 32c. per day, making their wages $2.30, and laborers 30c. per day, making their wages $1.90.

MICHIGAN.

Coal Miners' Strike.—The coal mines are all in operation, the miners having receded from their extreme position of demanding pay for pushing cars, whether they did the work or not.

MINNESOTA.

(*From Our Special Correspondent.*)

Boats have been at ore docks at Duluth, Two Harbors, Ashland and Marquette on Lake Superior and at Escanaba on Lake Michigan for some days. Ore roads are hauling to docks very fast, but are not on summer schedules, and will not be for some weeks. Freight rates for the season are unsettled, and no charters have been made. The United States Steel Corporation is not taking anything yet, and appears indifferent to what others may do. If a rate should be made at once it would probably be lower, comparatively speaking, than last year's.

Records prepared by Robert Angst, of the Duluth & Iron Range road, show an aggregate shipping capacity of ore docks on the upper lakes of about 40,000,000 gross tons, with a storage capacity for 958,000 tons. Mr. Angst figures the new capacity this spring at 106,356 tons, costing upwards of $1,000,000, but in his total he includes the Algoma Central dock, which was built two years ago. Of the gross capacity more than half is in Minnesota ports; Duluth, for the Duluth, Missabe & Northern road, 167,040; Great Northern, 168,000; Two Harbors, Duluth & Iron Range road, 168,760; total in Minnesota, 503,800, out of 958,000 at all Minnesota, Michigan and Wisconsin points. New construction in Minnesota consists of dock No. 3 for the Great Northern.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

An option has been taken on the nw. ¼ of the nw. ¼ of section 15, T. 58, R. 19, and drills have started. One hole is down 48 ft. in good ore.

W. P. Snyder & Co. have taken the sw. of the nw. of section 15, T. 58, R. 19, on which 6,000,000 tons have been proved, and will open a mine later. The same company will open the Webb at Hibbing for mining in 1904. It has the St. Clair, and it will ship 100,000 tons this year.

E. F. Sweeney is exploring on land adjoining the old Mesabi Chief property in section 24, T. 57, R. 22, and has found some ore under a heavy rock capping.

There is a more urgent call than ever for drills and drill operators, and the explorer who is able to get machines at work on land he desires to take up is fortunate. Many are unable to get machines, and are compelled to abandon explorations they had agreed to undertake. One drill contracting firm has 108 machines, about one-third of which are diamond drills, at work on the Mesabi Range alone, and another is running every machine it is able to get. New drill

contracting firms are going into the business, their main trouble being to get men they can trust. In this respect the old concerns have almost a monopoly. One drill company is running 13 heavy diamond drills, 4 for the Section Thirty Company, 4 for the Mahoning Ore and Steel Company, all on the Vermilion Range; 3 for Pickands, Mather & Co., in Michigan; 1 for the Deering Harvester Company, in the new North Freedom District, Wis., and one other. These drills represent an investment for borts alone of not less than $70,000. Aside from contract work many individuals are test-pitting and drilling with churns, but the work is passing more and more into the hands of experienced contracting firms.

East Biwabik Iron Company.—This company, composed of Duluth grain men, is exploring in the south side of section 2, T. 58, R. 16, with four drills at work. Ore has been found in four holes, and a merchantable body may be found. This work was begun by L. and A. Merritt, and sold out to T. Merritt and A. C. Hubbell, who in turn sold for $40,000 to the East Biwabik Company. Mr. Hubbell is president of the company, John McCarthy is vice-president and George Spencer is secretary and treasurer.

Mesabi Chief.—This mine has been sold to the Great Northern road for a cash bonus of $55,000 for the old 25c. lease. The ore is thin, and lies in stringers between surface and 150 ft., which are separated by sand and rock. There is a large tonnage of ore running about 40 per cent and non-bessemer.

Shenango Furnace Company.—This company's mine in section 22, T. 58, R. 20, will ship late this year, but no great tonnage can be produced till 1904.

M. A. Hanna & Co.—This firm is expected to buy the State lease on the ½ of the ¼ of section 6, T. 57, R. 20, which has been explored by D. C. Rood and associates for about 2,000,000 tons of rather low-grade ore. Explorations to prove the original work will be carired forward rapidly. The buyers pay $40,000 and 10c. additional royalty.

MONTANA.

(*From Our Special Correspondent.*)

The books of the United States Assay Office in Helena show that for March the total receipts of gold amounted to $177,476. Of this $141,473 were from Montana, $17,017 from Idaho, $3,630 from Nevada, $4,315 from Washington, and $11,041 from British Columbia.

FERGUS COUNTY.

(*From Our Special Correspondent.*)

This county during March sent to the United States Assay Office at Helena gold amounting to $71,095, all from the cyanide mills in operation near Kendall and Gilt Edge. This county is becoming, according to Assay Office returns, the greatest gold producer in the State. The larger portion of the gold won from the ores of most of the other gold-producing counties is extracted from smelting ores, and the record for this production is to be had from smelters and refineries.

GRANITE COUNTY.

(*From Our Special Correspondent.*)

The sum of $25,563 was deposited at the Assay Office for March from this county. During the hydraulicking season the gold production is much augmented.

Royal Gold Mining Company.—This company's property, on which a 10-stamp mill some years ago produced about $400,000 in bullion until the lead was lost, will be worked again.

LEWIS & CLARKE COUNTY.

(*From Our Special Correspondent.*)

The sum of $24,850 was deposited at the Helena assay office from the mills of this county for March.

Montana Mining Company, Limited.—The cyanide plant in the gulch a mile below the mills at Marysville, will resume work by May 1.

PARK COUNTY.

(*From Our Special Correspondent.*)

Helena & Livingston Smelting and Reduction Company.—This company has decided to reopen the coal mines at Cokedale, 8 miles from Livingston. When the company operated the smelter at East Helena some 10 years ago the chief fuel supply came from the Cokedale mines. Eight years ago a fire destroyed the headworks at the mines and the workings were allowed to fill with water. A good quality of coke was made in beehive ovens, which are to be repaired and the whole plant thoroughly overhauled within 60 days. The increasing demand for coal and coke throughout the State warrants the resumption.

SILVER BOW COUNTY.

Pennsylvania.—The Montana Supreme Court recently declined to grant a rehearing in the Pennsylvania Mine case, but made a re-division of the mine, whereby F. Augustus Heinze gains about 75 ft. additional in the vein. By its former division the court divided the property about equally between Heinze and the Amalgamated Company.

(*From Our Special Correspondent.*)

Pittsburg & Montana Copper Company.—The contract for building a smelter has been secured by Shackelton & Whiteway, of Butte. The works are to be on the flat east of Meaderville. The plans were drawn up in Pittsburg, the eastern headquarters of the company. This will be the first pyritic smelter in Butte.

Snohomish and Tramway.—Judge Knowles, of the United States Circuit Court has denied the application of Heinze's attorneys in the matter of reducing the pay of Receiver John S. Harris to $5 per diem, the court holding that the value of the property is such that the salary of $500 per month allowed is not excessive. The receiver has on deposit moneys from the operation of the two properties amounting to $210,000 as profit under his management.

NEVADA.

STOREY COUNTY—COMSTOCK LODE.

(*From Our Special Correspondent.*)

Consolidated California & Virginia.—In this shaft electricity is running the great pumps, and drifts which have been 10 years or more under water will soon be worked again. The hydraulic system unwatered the lode down to the 2,150 level. The three duplex Riedler pumps have each a capacity of 1,500 gals. a minute.

NEW MEXICO.

GRANT COUNTY.

Comanche Mining and Milling Company.—This Milwaukee, Wis., company is reported to have bought the smelter at Silver City owned by the Hearst estate.

NORTH CAROLINA.

STANLEY COUNTY.

(*From Our Special Correspondent.*)

Whitney Company.—This company, operating the Barringer Mine under the management of Col. E. B. C. Hambley, has struck rich gold ore at 40 ft.

OHIO.

JEFFERSON COUNTY.

M. L. Williams Coal and Coke Company.—This Pittsburg, Pa., company, organized with $50,000 capital, has secured 400 acres of Pittsburg seam coal land at Warrenton, and started work on it. A part of the property fronts on the Wheeling & Lake Erie Railroad, and part on the Cleveland & Pittsburg Railroad. A double entry is being driven on the Wheeling & Lake Erie frontage to give an output of 1,000 tons daily. The mines will be operated electrically, and mining machines will be used. The company has also secured 4,700 acres of coal land in Belmont County, in what is known as No. 8 Ohio seam, which will be developed. The officers of the company are: M. L. Williams, president; J. F. Keeling, treasurer, and C. F. Anderson, secretary and general manager. Offices have been opened in the Park Building, Pittsburg.

PENNSYLVANIA.

ANTHRACITE COAL.

According to a press dispatch, which evidently needs verification, a large field of coal has been proved between Wilkes-Barre and Nanticoke, through two bore holes sunk 2,300 ft. by the Lehigh & Wilkes-Barre and Delaware, Lackawanna & Western Coal companies. It is said that 8 beds, from 4 to 5 ft. thick, which were not expected, have been found above 11 veins, believed to exist.

Connell Anthracite Mining Company.—This company is now operating the mines of the State Line & Sullivan Railroad Company at Bernice, paying the State Line Company a royalty of 19c. per ton. It is stated that the Connell Company will erect another breaker. O. A. Baldwin remains as general manager of the State Line & Sullivan.

Philadelphia & Reading Coal and Iron Company.—This company is reported to be increasing its storage capacity in the anthracite region at Landingville, Mahanoy City, and other points.

BITUMINOUS COAL.

Berwind White Coal Mining Company.—This company recently bought the coal rights of between 2,800 and 3,000 acres of land in the Shankville District of Stoney Creek township for a consideration of $125,000.

Central Coal and Coke Company.—This Philadelphia Company has taken over about 3,000 acres of land in Bell and Washington townships, including the mines and equipment of the Roaring Run Coal Company, and the old Fairbanks and Grimtown mines, near Saltzburg. The reported consideration is given as $275,000.

Clark Coal Company.—This company is opening a new mine not far from Butler.

Colonial Coke Company.—This company, at Smock, is building 271 more ovens to give it a 400-oven plant.

H. C. Frick Coke Company.—The coke interests of the United States Steel Corporation in the Connellsville region have been merged into this company and its capital has been increased from $10,000,000 to $20,000,000. The United States Coal and Coke Company, operating in the Pocahontas region, and some other small coke concerns outside of the Connellsville region are not included. The concerns taken over are: United Coal and Coke Company, McClure Coke Company, Continental Coke Company, American Coke Company and Southwest Connellsville Coke Company, the latter formerly operated by the Illinois Steel Company. The merger gives the concern a total of about 18,000 ovens in the Connellsville region, or fully 75 per cent of the total producing capacity. The officials are: Thomas Lynch, president; D. H. Coble, secretary, and Philip Keller, treasurer. The directors are Thomas Lynch, C. M. Schwab, E. H. Gary, E. J. Buffington, W. P. Palmer, W. B. Schiller, Thos. Morrison, D. M. Clemson, D. E. Kerr and B. H. Coble. Headquarters are in the Carnegie Building, Pittsburg. During the past month the United States Steel Corporation, operating the United States Coal and Coke Company, has placed contracts for the building of 600 additional coke ovens in the Pocahontas fields in West Virginia. This concern now has 2,150 ovens in course of erection, and will have a total of 3,000 beehive ovens in the Pocahontas region.

Pittsburg & Eastern Coal Company.—This company now controls the Farrar tract of coal land in Smith and Mount Pleasant townships, embracing 2,600 acres. Frank M. Kirk, of the Kirkwood Coal Company, of Cleveland, O., and the Hazel Kirk Coal Company, of Monongahela, Pa., formed the new company, which will have an output of 3,000 tons daily, and ship over the Panhandle Railroad. The deal will involve an outlay of $1,250,000.

Stineman Coal Mining Company.—This company is making another opening near Bealtown, and will expend about $50,000 as a starter. The mine will be equipped with the latest machinery, and work will be pushed.

SLATE.

Lehigh Coal and Navigation Company.—This company has awarded a contract for removal of top at its West Bangor and Fidelity quarries, and for changing the location of the main line of the Lehigh & New England Railroad on its property at West Bangor. This contract involves the removal of 90,000 to 100,000 sq. yds. of earth and rock. Work is to be begun at once, and it is expected to be completed in a year and a half. At present the main line of the Lehigh & New England Railroad crosses the slate property within a few yards of the north side of the West Bangor and Fidelity quarries, and in order to develop these quarries further it will be necessary to move the track.

TEXAS.

HARDIN COUNTY.

(*From Our Special Correspondent.*)

Heywood Oil Company.—This company's well, at Sour Lake, is reported in. Arrangements have been made to sell the product at the well for 40c. per bbl.

Sour Lake Springs Oil Field.—It is said that the total oil marketed from here in 1902 was less than 65,000 bbls., and that was handled by the Guffey pipe line to Beaumont.

Texas Company.—This company has bought all the property of the Sour Lake Springs Company for $1,000,000 cash. The deal is the largest on record in Texas oil business. The property contains 850 acres and lies in the center of the producing field at Sour Lake. Many wells will be drilled, and the property will be developed at once. The company have two large steel tanks completed, and pipe lines are being laid.

JEFFERSON COUNTY.

Fire at Beaumont.—An overturned lantern at one of the Caldwell wells on the Hogg-Swayne tract, Spindle Top Heights, on April 15, started a fire that swept nearly the whole tract on which were 175 wells. Only 5 derricks were left, and pumping stations and pipe lines were ruined. The total loss is estimated at nearly $1,000,000. Among the losers are London Oil and Pipe Line Company, Caldwell Oil Company, Spindle Top Power Company, Central Power and Equipment Company, pumping station, Dividend Oil Company, Detroit-Beaumont, Palestine-Beaumont, Sun Company, Advance Oil Company, Queen City, Queen of Waco, Drummore, Alamo, Buck Eye, Ground Floor, Manhattan, Borealis and Buffalo. Losses were also sustained by owners of drilling rigs, among whom were H. B. Ford, Cartwright Oil Company, John Markham and J. W. Ennis. The Texas, Sun, London Oil and Pipe Line, Guffey, Higgins and other companies lost through damage to pipe lines. The Heywood tract was saved after hard work.

(*From Our Special Correspondent.*)

Applications for receivers have been filed against the Burlington Oil Company, the Eureka Oil Company, and the Greater New York Home Oil Company. The Texas Company has sued the Central Asphalt and Refining Company for $40,000 for oil delivered, and alleges that the defendant is insolvent.

Beaumont Oil Field.—The Great Southern refinery, began regular operation on April 1, and the Burt refinery will probably start about May 15.

March shipments were disappointing,being less than 750,000 bbls. It would not be surprising if shipments of crude declined rapid.y, for production is decreasing and the refineries are absorbing more of the output. The increased value of crude also checks consumption, and some factories are returning to lignite fuel. Crude is steady at 75c., f. o. b. Beaumont, and $1.10@ $1.15 at Galveston. These companies which undertook to give a barrel of crude oil with every share of 10c. stock purchased by investors are in trouble, and parties who hold such contracts have little chance of obtaining their rights. Fake companies are having a hard road to hoe and most of them will be in the hands of receivers very shortly. The confiding public will have to burn up a good many millions in embossed certificates.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Shipments.—For the week ending April 10 the Salt Lake banks reported settlements on ore and bullion as follows: American Smelting and Refining Company, bullion, $128,000; gold, silver, lead and copper ores, $125,350; gold bars, $10,600; total, $263,950.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Frisco Shipments.—For the week ending April 10 the Horn Silver Mine sent 4 cars of ore to the smelters.

Mark Hanna.—A gasoline hoist has been sent to this property adjoining the Majestic Company's mines.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—For the week ending April 10 the receipts at the samplers were: Eagle & Blue Bell, 4 cars; Bullion-Beck, 2 cars; Gemini, 6 cars; Mammoth, 13 cars; Carisa, 2 cars; Star Consolidated, 1 car; Lower Mammoth, 2 cars; Grand Central, 25 cars; Yankee Consolidated, 5 cars; Martha Washington, 1 car; Victor Consolidated, 6 cars; Ajax, 2 cars.

Centennial-Eureka.—Sinking in the main shaft, near Tintic, has been discontinued, owing to surface seepage. Work will be resumed as soon as the flow stops, probably in a couple of weeks.

Joe Bowers.—Leasers report a strike of lead ore near the 400-ft. level.

Mammoth.—More gold ore than was expected has been found in the east fissure of this Tintic mine. A cross cut has opened 26 ft. of ground.

May Day.—The new directors are: M. H. Walker, T. A. Cunningham, Ed. W. Duncan, Alveras E. Snow and John A. Hunt. The board will, in a few days, elect officers.

Star Consolidated.—Some good gold ore is reported on the 300-ft. level. A few inches show values as high as $200.

Tetro.—A strike of 16 in. of lead ore in this Tintic property is reported in a winze about 300 ft. below surface.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated Smelter.—For the week ending April 10 the shipment East amounted to 180,000 lbs. of copper bullion.

Dewey Mill.—This concentrator at Bingham will soon be running steadily, it is said, on ores from the Kempton Mine.

Highland Boy Smelter.—For the week ending April 10 the copper bullion sent East aggregated 4 cars, or 240,000 lbs.

Shawmut.—This Bingham property, comprising 8 claims and a concentrator, will be sold under the hammer to satisfy liens.

United States Company.—It is stated that at least 650 tons of ore daily are coming from the company's Bingham properties.

United States Smelter.—For the week ending April 10 the copper bullion shipped East amounted to 182,430 lbs. or 3 cars.

Yampa.—This Bingham property will deliver to the Bingham Consolidated Smelter 30,000 tons during the year's life of the contract. Shipments of ores have already started.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Park City Shipments.—For the week ending April 10 the receipts at the Mackintosh Sampler were: Daly West, 2,188,300 lbs. of ore and concentrates.

Liberty Mining Company.—This company has been formed to develop 265 acres of ground at Park City. The groups included are the McHenry, Wasatch, Belcher, the Ontario's holdings in the Romeo group, and other claims. The company has 500,000 shares, par value $2; 100,000 shares are in the treasury. Thomas Kearns is president, W. Mont Ferry vice-president and treasurer; E. S. Ferry, John Creen and J. T. Richards, with the above, are directors. H. Jones is secretary.

Naildriver.—The new boilers, engine and hoists will be in position in a few days.

Ontario.—The ledge at the 2,000-ft. level will be tapped in 220 ft. Calculations at neighboring mines will be based on the findings.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Stockton Shipments.—For the week ending April 10 the Ophir Hill shipped 9 cars of concentrates.

Honerine.—The long drain tunnel has begun to show results. A flow of not less than 2,000 gal. is reported coming from the Bullion ledge. The ground to be unwatered has produced millions above water level.

FOREIGN MINING NEWS

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—In the week ending April 3 the mines of the Granby Company were the only ones on the shipping list. Their output was 4,512 tons, making a total of 132,762 tons shipped by the mines of Boundary for 1903. The Granby Smelter treated 4,450 tons of ore during the week, making a total of 81,983 tons this year. Owing to a washout on the Arrowhead branch tying up shipments of coast coke, on which the Granby Smelter has been relying for several weeks, the company was forced to blow out the two furnaces in operation, and every furnace in the Boundary District was consequently idle. All the smelters are now at work or preparing to work, because coast coke is on the way, and shipments from the Crow's Nest collieries are being resumed.

BRITISH COLUMBIA—VANCOUVER ISLAND.

(*From Our Special Correspondent.*)

James Dunsmuir seems determined not to recognize the Western Federation of Miners. At his Extension mines, when a union was formed, he discharged 1,000 men and shut the mine down. Now a branch of the Federation has been organized at the Union mines, and probably 500 more men will be discharged. He has refused to meet a deputation of the striking coal miners while they were connected with the Federation.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Company.—The shipments of coal in March, the first month of the fiscal year, were 216,516 tons, against 175,346 tons in March, 1902; an increase of 41,170 tons. The total coal mined last month was 280,987 tons.

NOVA SCOTIA—HANK COUNTY.

(*From Our Special Correspondent.*)

West Gore.—From 1883 to 1888 a small local company worked this antimony mine to a depth of about 350 ft., raising about 3,000 tons of ore, which averaged 50 per cent antimony. This ore was sold and shipped to Henry Bath & Son, Liverpool, Eng., for its antimony value, and was treated at Swansea. Some time ago the abandoned property was acquired by Alexander McNeil, of Halifax, who had samples of the ore fully analyzed, with the result of finding it contained more gold than antimony values—probably double. Mr. McNeil formed a company, the Dominion Antimony Company, which has erected a plant, unwatered the mine, and is now driving levels at depths of 60, 120 and 250 ft. All of the levels are in ore varying from 10 per cent to 50 per cent antimony. The ore will probably be treated at the mine, and experiments are underway. The company owns 760 acres of mineral lands and 850 acres of woodlands. The Midland Railway Company is about to build a spur to the mine.

ONTARIO—MANITOU DISTRICT.

(*From Our Special Correspondent.*)

Mining prospects in this district are bright, as the work laid out is more than treble that of any other year. Supplies required for the period before navigation opens in May are being rushed to the mines. In about two weeks the ice will be unsafe. Many new companies have been organized in the States to carry on work during the coming season; among them the Subilee Mining Company, the Redeemer Mining and Milling Company, the Free Gold Mining and Milling Company, and the Manitou Mining and Milling Company, which have already acquired properties, and are awaiting the opening of navigation.

Summit Lake Gold Mining Company.—This company is operating the Little Master Mine. A steam hoist and boiler will replace the horse whim used hitherto. S. V. Halstead is general manager, and A. I. McLean president.

YUKON TERRITORY.

Joseph Ladue Gold Mining and Development Company.—The stockholders at a recent meeting in Jersey City, N. J., voted to dissolve the company and to reincorporate in South Dakota. President Elmer F. Botsford, of the company, said this step was taken to save about $4,000 a year of tax expenses.

MINING STOCKS.

(Full quotations are given on pages 617 and 618.)

New York April 15.

The copper shares have suffered heavy declines, and the leaders, Amalgamated and Anaconda, have touched the lowest prices this year. In explanation of this depression brokers point to the general bearish condition of the stock market, owing to the adverse decision in the Northern Securities case. Optimistic traders, however, are trying to reconcile investors by telling them that the depression is only temporary. They contend also that the stock market will recover as quotations in many instances have almost sounded bottom and certainly do not reflect the general business prosperity. At the close this week the market again recovered.

Amalgamated copper dropped on Monday from $64¼ to $60, and Anaconda from $26½ to $25⅛. On curb copper shares were sympathetically weak, Greene Consolidated, of Mexico, selling down to $23¼, Tennessee to $29, British Columbia to $4½, and White Knob, of Idaho, to $11½.

In the gold and silver list sales are moderate at comparatively low prices. Portland, of Cripple Creek, though it announced its regular 3c. quarterly dividend, brought only $1.40, while Isabella weakened to 19c. Small Hopes, of Leadville, changed hands at 52c. Iron Silver, in the same district, declared a second dividend of 10c. a share this year, payable May 1, making the grand total to date $2,750,000. This is equivalent to 27½ per cent on the capital stock. Of the Comstocks there were sales of Ophir at $1.90, Consolidated California & Virginia, $1.60, and Chollar at 30c. Silver Hill, a dividend payer, of Silver City, Nev., made a sale at 72c.

Boston. April 14.

(*From Our Special Correspondent.*)

Copper shares have been as utterly demoralized as the railroad and industrial share market. Activity has been largely in Copper Range Consolidated, Centennial, Utah Consolidated, United States Mining, Mohawk, Trinity and Winona, but at receding prices. The depression in this class of stocks is caused mainly by enforced liquidation, with no buyers in the market. In fact, the local market has been almost as demoralized as the New York market. It is assumed in some quarters that the decision in the Northern Securities case has checked some copper plans that are known to be on the tapis.

Copper Range Consolidated, on heavy trading, has fallen $6 to $56, with recovery to $58. The stock sold at $75 early this year, so that the low price recorded represents a $19 decline. The weakness has given some people a chance to take in a line at low prices. The strength of Utah Consolidated is persistent and shows that the stock is being accumulated by powerful interests. The stock has had an extreme fluctuation of $1.37½ during the week from $28.25 to $26.87½, closing at $27.75. The directors meet in New York this week. Centennial dropped $3.75 to $20.25, rallying to $25. The Centennial will use the Arcadian mill as soon as the former is ready to stamp its rock. Encouraging reports continue to come from the Kearsarge shaft, now being sunk.

United States Mining fell $1.50 to $22.87½, recovering to $23.12½. Although considerable stock has changed hands the buying is by the best people. The buying to-day was by one of the best houses on the Street, and it is estimated that this one firm has take nover 10,000 shares in the last 10 days. Mohawk slid off $4.50, touching $46.50, but easily recovered to $48.75. Winona fell $1.37½ to $8.50 in the scramble to sell stocks, and Trinity became active to-day, selling off to $8.50. This is very close to its lowest price. Osceola fell $4.50 to $64, but rallied to $66. As yet the stockholders' protective committee has given no enlightenment as to how the property is being managed.

Tamarack has lost $7 to $140, while Calumet & Hecla has held at $520@$525, and Quincy at $110@ $115. Wolverine has fluctuated between $72.25@ $70. Atlantic is off 87½c. to $11.12½; Bingham, $1.75 to $29; Mass, $1 to $9.50; Parrot, $1.50 to $26.50; Old Dominion, $1 to $17, and Isle Royale, $1.25 to $10.75. The Bingham Consolidated is reported looking for more mineral territory, and is bound to be a large factor in the Utah camp. Guanajuato sold freely at $1.50. The March product was valued at $60,000, which is the banner month.

The Arcadian is not expected to continue rock shipments to its mill after this month. The stock is off to $3.50 per share. The annual meeting of the Copper Range Consolidated will be held May 6.

Colorado Springs, Colo. April 10.

(*From Our Special Correspondent.*)

The week was a disappointment to many who had supposed that with the conclusion of the strike at the chlorination mills at Colorado City the market would show a decided improvement, but such has not been the case. On the contrary, the market was soft and spotty this week, with nothing in particular to cause

it, unless it is the continued weakness of Isabella. The latter shares have suffered by reason of the failure of the company to resume operations since the strike, the stock selling from 17 to 15½c., and up to 16½c., only to weaken to-day to 15½c. The directors promise an official statement, which is surely due the stockholders under the circumstances.

Portland strengthened on account of the declaration of the usual quarterly dividend of 3c. a share, or $90,000, on the former day. The stock, however, lost some of its buoyancy to-day in the general softness of the market, and sold down to $1.33. Vindicator, which is paying the highest dividends in Cripple Creek, sold at 98c. this week, closing to-day with 96c., bid, with $1.05 asked. El Paso sold from 60⅝c. to 58½c. to-day, while Elkton sold at 36c., 37½c. and back to 36½c., at which figure it closed. Acacia sold at 9¼c., 9c., and back to 9¼c. Findley strengthened mysteriously this week, selling at 12½c.

Salt Lake City. April 10.

(From Our Special Correspondent.)

The week closed on a steady market, yet dull and featureless. This condition has been maintained for the last six weeks or more. Few buying orders from the outside confined the trading to the local men, and some scalping has been the main interest. General prices of last week have been sustained. The unlisted stocks have had no activity. The business of the week amounted to 214,710 shares, which brought $165,197.

San Francisco. April 11.

(From Our Special Correspondent.)

Business has been rather quiet, with prices somewhat heavy, and a lower range of quotations. The Exchange did not close on Friday, but very little business was done.

Ophir sold at $1.70@$1.75; Consolidated California & Virginia, $1.55@$1.60; Mexican, $1.25; Sierra Nevada, 88@98c.

The San Francisco Stock Exchange Board has admitted to the list six companies operating in the Tonopah District in Nevada, and it is expected that other companies from the same district will be listed. The new companies' stocks were called on Monday for the first time.

The new companies listed are the Colehan, the Gold Mountain, the Lucky Four, the Ray Extension, the Tonopah North Star, and the Tonopah Union. At the first call on Monday the sales of four of these Stocks were: Colehan, 40c. a share; Gold Mountain, 22c.; Lucky Tom, 25c.; Tonopah North Star, 50c.

Preliminary steps have been taken to organize the San Francisco & Tonopah Stock Exchange in this city and thus far 52 charter members have signed the roll. Henry C. Cutting has been elected president; Emile E. Kahn, vice-president; Louis Hagan, secretary, and J. L. Ewen, treasurer. A committee is to be appointed to draft a constitution and by-laws, and to select rooms for the new exchange, and this committee will report at a meeting to be held April 13.

Business in oil stocks has been rather quiet, but prices pretty well supported. Some quotations noted are: Thirty-three, $8.50; Sterling, $3.10; Home, $2.80; Oil City, 33c. The Exchange was closed on Friday and Saturday.

The monthly record of sales on the California Stock and Oil Exchange, since January 1, 1903, is as follows:

	Shares.	Value.
January	267,019	$255,202
Febuary	322,443	219,358
March	199,908	151,982

This shows a total for the three months of 789,370 shares, the selling value being $626,542.

COAL TRADE REVIEW.

New York, April 16.

ANTHRACITE.

Continued stormy weather has kept up the retail demand for anthracite and strengthened the general market, although had the weather been clear and warm the disposition of dealers to get what coal they could at April discounts would of itself ensured a good wholesale demand. The weather has restricted coastwise shipments, and also production at the mines. The petty strikes noted last week are practically ended, most men returning to work under orders from President Mitchell; the questions in dispute are to be referred to the conciliation committee that will probably be organized as soon as the miners name their representatives. It is probable that these representatives will be the presidents of the three anthracite districts of the United Mine Workers. Operators are complaining that whereas miners worked briskly while the Anthracite Commission was in existence, apparently fearing that any systematic "sojering" would be investigated by that body, now there is a general disposition to take things easy and to shirk. It is apparent that the board of conciliation will have a lot of work to do, as the miners evidently intend to try to secure more than the commission awarded [illegible].

The production of anthracite in March is estimated at 5,200,000 tons, or 1,381,233 tons in excess of the output in March, 1902, and about 130,000 more than in February, when the output was 5,070,608 tons, but a falling off of 764,950 tons as compared with January. The output for the first quarter of this year has broken all previous records, the average monthly production being at the rate of about 65,000,000 tons a year. The total for the quarter this year is 4,137,400 tons in excess of 1902, and 1,917,359 tons more than in 1901.

Trade at Lake Superior points is light, as few boats have arrived, a great fleet being still tied up at Lake Erie ports by the strike of the oilers. The early opening of navigation is not going to be such a benefit to trade in the Northwest as was expected. Much the same may be said of trade at Lake Michigan points. Considerable coal is going all-rail to Chicago. It is said that some of the large dealers at Chicago are declining to close season contracts. It is thought this is simply a precautionary measure, since they do not care to contract until they feel sure of getting the coal with some promptness. Sales agents anticipate no real decline in the consumption of anthracite in spite of higher prices, as its merits as a household fuel are too apparent to cause consumers to hesitate in a time of general prosperity. At points along the seaboard demand is active, and the tonnage going into storage at April prices is limited by the ability of the operators to produce the coal and of vesselmen to get it forward. The April prices for free-burning white ash, f.o.b. New York Harbor points, are: Broken, $4.75; egg, stove and chestnut, $4.50.

BITUMINOUS.

The Atlantic seaboard bituminous trade is easier. There is more coal for sale, while demand has fallen off. The current price for Clearfield grades is about $3, f.o.b. shipping port; some coal selling for $2.90 and some up to $3.10. Considering the advances in wages and rail freights these prices represent an actual advance to the producer of about 20c. per ton, the price for Clearfield coal on season contracts at this time last year being about $2.65, f.o.b. shipping port. Some producers are complaining of being able to sell coal, while they are made uncomfortable by the strict regulations of the railroads concerning demurrage on coal standing at tidewater. These regulations may injure some dealers and shippers who have not sought to take advantages, though it is known that some persons have been in the habit of using railroad cars as storage plants. The charge of $2 made by the railroads on cars re-consigned at tidewater is to some extent at least a benefit to the trade, since it will stop the tactics of those guerillas in the trade who have been in the habit of buying coal from possibly half a dozen producers and shipping lots thus picked up in one cargo under one name.

The weather of the past week has hindered the coastwise movement of vessels and barges and tonnage at the shipping ports will probably be scarce by Saturday. At the mines the labor situation is unchanged. There have been a few small strikes of no especial significance, and present indications are the United Mine Workers will not try to force the recognition of the union on employers until the miners in Maryland and West Virginia are better organized.

Trade at points beyond Cape Cod is quiet. Dealers and consumers seem to have fair stocks on hand, and demand is largely limited to orders on new contracts. Along Long Island Sound the market is dull, and probably will be for a few weeks, as is apt to be the case at this time of the year. Trade at New York Harbor points is very quiet. Consumers in the all-rail trade seem to be getting all the coal they want, and show decided apathy at taking more.

Transportation from the mines to tidewater is up to all requirements. Car supply at the mines ranges from 40 to 70 per cent. In the coastwise vessel market vessels are scarce and in demand. Philadelphia quotations are 95c.@$1 to Long Island Sound points and $1.25@$1.40 to Boston, Salem and Portland, according to size of craft. Quotations from New York Harbor are 65c. to Sound ports and $1@$1.15 to Boston, Salem and Portland, according to size of craft.

Birmingham. April 13.

(From Our Special Correspondent.)

Though the domestic coal trade is a little on the wane right now, it is not believed that there is going to be any falling off in production of coal hereabouts this summer. As to other than domestic coal not too much can be mined. The coke ovens continue in full blast, while other requirements are heavy. Some of the domestic producers say that they can get out after orders, but do not care to stir much until after the new wage contract with the miners has been made. The convention will be held in June. It is understood, however, that operators will ask for the same prices and some changes in rules governing the work at the mines. There are rumors that an effort will be made by the miners to have an 8-hour rule adopted, which may bring out strong objections.

Your correspondent during the past week made a trip through the northern part of Jefferson and Blount counties, and there was much activity in mining to be noticed. Along the Louisville & Nashville and Birmingham Mineral railroads the activity was particularly strong, while in Blount County there is considerable work being done at Stout's Mountain. Other mines are to be opened in Blount County in the near future. At Cunningham, Jefferson, Warrior and other points in Jefferson County new mines are being opened or old mines are being enlarged. The Lehigh Coal Company will open up new mines at its property in Blount County, the Louisville & Nashville Railroad having let the contract for the building of a mile extension from its present mines to the new openings. The Davis Creek Coal Company, near the edge of Jefferson and Tuskaloosa counties, is enlarging its output. J. C. Maben, of the Sloss-Sheffield Steel and Iron Company, is interested in this concern.

The Tutweiler Iron, Coal and Coke Company is building 100 ovens at the Short Creek mines. The presence in the city of coke men from Pennsylvania and Ohio has caused much talk of the erection of immense by-product coke oven plants in this State. The statement is made that H. C. Frick has had a representative in this section looking after coal land and other property on which to open mines and erect coke ovens for the manufacture of coke on an extensive scale. There is no verification of the rumors.

Chicago. April 13.

(From Our Special Correspondent.)

The fairly active condition of the wholesale coal market reported last week continues; dealers are well satisfied with existing conditions and the outlook. There is much skirmishing by large users to secure contracts renewed at last year's prices or thereabouts, but the Western operators are not inclined to make contracts this year. They realized too great a profit on their free coal last winter, and do not feel so dependent on the contract output to keep their mines running throughout the summer, as formerly. Indiana and Illinois bituminous cannot now be contracted for at less than 25 to 50c. higher than last year's prices, and even at this advance there is more anxiety for the contract on the part of the buyer than the operator. This sort of thing naturally aids the dealers who are not operators.

Anthracite continues at $6 for stove, egg and nut, on cars, and is not in active demand, though the rail supply is not yet normal, and none is expected to arrive by lake for two weeks. The middle West apparently has found out that it is not so dependent on anthracite as it thought itself at the beginning of winter. Anthracite is likely to be less in demand this summer than for many years before.

Smokeless continues to be in active demand, of bituminous coals, and sells at $3.75@$4; Hocking brings $4; Youghiogheny, $3.25; blacksmith's coal, $3.75@$4; Indiana and Illinois lump and egg, $3, for the better grades. The railroads are reported to be buying considerably less coal, and this will naturally throw more bituminous on the market.

Cleveland. April 14.

(From Our Special Correspondent.)

Coal shipments by lake are beginning to be quite heavy, and the market is strong. The movement is as brisk as the movement of vessels will permit, as all of the boats leaving for the upper lake ports are taking coal cargoes. All along Lake Erie boats are held in ports with coal cargoes in them waiting the end of the strike of the firemen to let them get started. At Ashtabula fully 30,000 tons are afloat, and at other ports similar amounts in proportion to their regular business. Nothing has been said as yet about season carrying contracts. The movement to date has been governed entirely by the going rates established two weeks ago, namely, 40c. to the head of the lakes and 50c. to Lake Michigan. Some talk has been heard of advancing the rate out of Buffalo, where they are looking for boats, but this has not been done.

The domestic supply in this territory has been increased during the past week. There have been frequent reports of the return of congested conditions on the railroads in this territory, but the railroads seem to be in better shape than ever, and the material is moving freely. In fact, the coke conditions in the Valleys are better than they have been for eight months, and the furnaces are running full. Manufacturers through this territory are also having all the coal they need. The market has been strong, with the buyers paying willingly the prices that have been asked. It is said that sales agents from this territory have sold enormous quantities of coal in the Northwest, greater than has ever been seen in the history of the trade.

Pittsburg. April 4.

(From Our Special Correspondent.)

Coal.—The week opened with all the mines in the Pittsburg District in full operation for the first time in several months. The railroads are furnishing all the cars required, but there is no certainty that this will continue. A large tonnage is going to lake ports, and the demand is heavier than it has ever been at the

opening of the season. Prices are firm, and few long term contracts outside of the lake trade are being taken. The United Mine Workers' executive board has decided to keep 100 organizers in the field this year, and a number of them will come to this district during the week, and will be put to work in the Irwin field. There are about 20,000 miners in that region, and the price paid is considerably lower than the Pittsburg District. It is proposed to establish a uniform mining rate if possible. Most of the coal mined in the Irwin field goes to the Eastern trade.

Connellsville Coke.—The production and shipment is improving and the demand continues with prices firm. The furnaces in the valleys are getting enough coke to keep in operation, but deliveries are not altogether satisfactory, and premiums are paid in some instances to get prompt shipment. The *Courier*, in its last report, gives the production for the previous week at 248,500 tons. The shipments for the week aggregated 11,624 cars, distributed as follows: To Pittsburg and river tipples, 3,549 cars; to points west of Pittsburg, 6,252 cars; to points east of Connellsville, 1,823 cars.

San Francisco. April 11.

(From Our Special Correspondent.)

Mr. J. W. Harrison's monthly circular on coal imports says: "Since the last steamer, the *Sonoma*, left for Australia, only one vessel has arrived here with coal, the *Hoche*, 2,940 tons. This makes but two arrivals of Australian coal since January 14. This deficit will be made good by the coal deliveries to be made here from Newcastle within the next 90 days. There are at present on the engaged list from Australia 66 coal carriers, with a capacity of nearly 200,000 tons of coal. The total receipts of Australian last year were 197,328 tons. Last year at this time there were 31 vessels listed, with a carrying capacity of 90,000 tons, and coal freights were about 3s. per ton less than the asking prices of to-day. This is a very formidable aggregation of fuel carriers, in the face of the liberal deliveries of fuel oil. There are valid reasons for these generous shipments, one of which is the abrogation of 67c. per ton duty, and another is the labor disturbing elements in British Columbia, causing the non-shipment of coal from the principal collieries there. Coal freights from Australia have advanced fully 3s. per ton within a month, and our importers are now securing vessels at top rates. The present quotations will lead to heavy shipments from Washington, as coast freights are low, and coal can be had there in large quantities. The elimination of duty on coal, remaining as it is now, leaves an uncertainty what policy may be adopted at the next meeting of Congress. If it receives no attention it again becomes dutiable January 15, 1904."

Yard prices to dealers for Pacific Coast coals in large lots are as follows: Wellington, $8.50; Southfield, $8; Rosslyn, $7; Seattle and Bryant, $6.50; Coos Bay, $5.50; white ash, $5. Rocky Mountain coals in car-load lots are quoted at $14 for Colorado anthracite, and $8.50 for Castle Gate, Clear Creek, Rock Spring and Sunnyside. Eastern coal in cargo lots is at present nominal, but quotations continue at $14 for Pennsylvania anthracite and $12 for Cumberland. Foreign coal in cargo lots sells as follows: Welsh anthracite, $13; cannel, $8.50; Brymbo, $7.50; Wallsend, $6.50.

Foreign Coal Trade. April 16.

Export trade here continues very light, while there is nothing new in imports.

Imports of fuel into Germany for the two months ending February 28 are reported as follows, in metric tons:

	1902.	1903	Changes.
Coal	673,223	792,512	I. 119,289
Brown coal	993,780	1,155,211	I 161,431
Coke	66,459	68,648	I. 2,189
Total	1,733,462	2,016,371	I. 282,909

The coal came chiefly from Great Britain, while the brown coal was from Austria.

Exports of fuel from Germany for the two months ending February 28 are reported as follows, in metric tons:

	1902.	1903.	Changes.
Coal	2,365,177	3,022,066	I. 656,889
Brown coal	2,926	3,471	I. 545
Coke	301,570	387,160	I. 85,590
Totals	2,669,673	3,412,697	I. 743,024

Exports of coal were chiefly to Austria, Holland and Switzerland; of coke to Belgian and France.

Messrs. Hull, Blyth & Co., of Cardiff and London, report under date of April 3, that the general tone of the Welsh coal market remains unaltered, and prices continue as last quoted. Quotations are: Best Welsh steam coal, $3.42@$3.48; seconds, $3.36; thirds, $3.24; dry coals, $3.30; best Monmouthshire, $3.06 @$3.18; seconds, $3; best small steam coal, $2.16; seconds, $2.04; other sorts, $1.80.

The above prices for Cardiff coals are all f.o.b. Cardiff, Penarth, or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market remains steady and fairly active, with rates unaltered. Some rates quoted from Cardiff are: Marseilles, $1.65; Genoa, $1.65; Naples, $1.62; Las Palmas, $1.62; St. Vincent, $1.74; Rio Janeiro, $2.40; Santos, $2.88; Buenos Aires, $1.98.

IRON TRADE REVIEW.

New York, April 16.

The iron market has not shown any special activity this week. In some respects, conditions are better, but the concessions which have been made in pig iron and in other branches have inclined many buyers to believe that there will be a further movement of the same kind, and have developed a tendency to hold off for the present.

Conditions at mills and furnaces are generally much better. Railroad transportation is good. Deliveries of fuel are showing much less delay than they have during the winter. Production is going on a large scale, and the mills generally have all made strong efforts to catch up with their contract deliveries.

The movement of iron ore from Lake Superior is still delayed by the strike of the steamship firemen. Two or there cargoes have arrived at Lake Erie ports, but the great majority of boats are still tied up.

Exports of pig iron from Germany for the two months ending February 28 were 74,587 tons, against 51,272 tons in 1902; an increase of 23,315 tons, or 45.7 per cent. The exports of all iron and steel products, except pig iron, were 505,561 tons; an increase of 65,022 tons over last year.

Birmingham. April 13.

(From Our Special Correspondent.)

The statement is made by high officials of iron-making concerns here that there will be no further reduction, and no fears are expressed that there will be any acumulation of iron, though prices are held up. It is also stated Western consumers believe they are entitled to the same prices as are paid by Eastern consumers—$1 less than their price—and for this reduction some of them are holding off from the market. J. W. McQueen, second vice-president of the Sloss-Sheffield Steel and Iron Company, who is in full charge of affairs of the company at the general headquarters, asserts that sales are equal to the production at present, and judging from the inquiries that are being received there will be no trouble in disposing of the future make. Selling for the third quarter of the year has started in. In the first nine days of the present month, the Sloss-Sheffield Company sold over 7,000 tons of iron, which is a little more than the make. Other companies in this district are doing as well. The statement is reiterated that the reduction in quotations was brought about entirely through the invasion of foreign iron, notwithstanding claims of consumers that their "waiting" policy had much effect.

The following quotations are given for Western business, as prevailing here: No. 1 foundry, $18.50 @$19; No. 2 foundry, $17.50; No. 3 foundry, $16.50 @$17; No. 4 foundry, $16@$16.50; gray forge, $15.50; No. 1 soft, $18.50; No. 2 soft, $17.50. These prices, as has been stated before, are $1 in excess of those paid by Eastern consumers.

In finished iron and steel circles conditions are favorable. The rolling mills are doing well, and the production is heavy. Good prices prevail. The little rolling mills at Anniston have been sold for the benefit of the creditors, and it is announced arrangements are being made to settle the financial troubles and resume operations at the plants. At the steel plant at Ensley some of the open-hearth furnaces are still undergoing repairs, and the production of steel is not as large as it has been at times this year. The steel rail department is in operation. The plant of the Alabama Steel and Wire Company at Ensley is in steady operation, though much trouble has been experienced in getting a full supply of steel. E. T. Schuler, one of the high officials of the company, announces that twelve months hence the company will be manufacturing its own steel at its own plant now being constructed at Gadsden. He also announces that one of the blast furnaces at Gadsden will be making iron before the end of the summer, and by the end of the year two others will be finished. A couple of months later the steel plant will be ready to make steel. By that time the Louisville & Nashville Railroad will have completed the extension of the Birmingham Mineral Railroad from Altoona, in Blount County, to Gadsden, in Etowah County, giving a through line from the Ensley plant to Gadsden.

Foundries and machine shops in this district are doing well. Brass foundrymen report much activity. Scrap iron is also very brisk.

Chicago. April 13.

(From Our Special Correspondent.)

The pig iron market remains quiet, and quotations are unchanged from last week. Coke has in the last week shown a remarkable drop; it is now quoted at $7.50@$8, against $9 a week ago. The reason for this change appears to be a combination of better transportation facilities, increased output of coke and something of a falling off in the demand for coke for fuel purposes due to warm weather. In the winter just past coke was much used in place of anthracite, in Chicago. That the change is welcomed by furnace men and foundry men alike needs not to be said; the new price, if not so low as that which prevailed a year ago, is sufficiently below the high prices only recently paid, to encourage everybody and to start into active operation the furnaces that have been closed, some of them for several months.

No. 2 Southern is quoted at $21.85, Chicago, for the last half of the year. No. 2 Northern brings $22. The customary 50c. over these prices obtains for No. 1 iron, either Northern or Southern, and the same amount less applies to No. 3, on lots corresponding as to size and time of shipment.

The reduction in the price of iron by the Southern combination of $1 for the West and middle West, has so far failed, apparently, in stimulating buying as was expected. Buyers appear to be of the belief that a break in the market is impending, and not even the drop in the price of coke makes them inclined to purchase more than seems necessary.

Cleveland. April 14.

(From Our Special Correspondent.)

Iron Ore.—Nothing has been done toward fixing the rates of carriage on ore for this season. The first cargo has been received from Lake Michigan, and the first cargoes are on their way down the lake from Lake Superior. The boats moving are those owned by the ore shippers. The movement is not likely to be very brisk for some time, as the strike of the marine firemen has about tied up the lake fleet, and it is possible that it will be May 1 before any general movement takes place or any rates are fixed. The prices quoted on ore continue to be based on $4.50 for bessemer old range, and $4 for bessemer Mesabi.

Pig Iron.—Foundry grades are selling actively for first-half deliveries, but the amounts are small. The supply is limited, and material is obtained only from furnaces outside of this territory. Sales into the second half have been held up because the Birmingham furnaces made a cut in price to $17.50, Birmingham, to meet Northern and foreign competition, and the consumers have come to expect further reductions. Meanwhile the prices have held firm, being quoted as follows: No. 2 foundry, $22, f.o.b. Southern Ohio furnace, for first-half delivery, and $21@$21.50, Valley furnace, for second-half delivery. Basic iron is in good demand for first-half delivery, and the market is firm, the difficulty seeming to be to get the material, of which the consumers find themselves absolutely in need. Some of the mills are unable to get all of the material they want, and conditions through the remainder of the first half do not promise anything better in that line. Second-half buying is light, and, in fact, no sales of any consequence for that period have been reported. The prices are unchanged at $21.50@$22 for first half and $20 for second half Bessemer is still dull, nothing being reported. Prices hold at $21.50@$22 for first-half delivery, Valley furnace, and $20.50@$21 for second half.

Finished Material.—Inquiries for rails have been more active during the past week. Some of the projects, however, are doubtful, and may not develop into sales. Prices hold firm at $28 for standard and $36 for light rails. The bar mills have received a number of inquiries for large amounts of material, but as yet no big contracts have been made. The action of the association in reaffirming prices has about decided some of the buyers that any hope of getting a concession from the present figures is impossible, and they will cover soon. Some big contracts are expected within the week. Bar iron is selling fairly well, but with no great rush. Prices are unchanged at 1.60c., Pittsburg, for bessemer steel; 1.70c., Pittsburg, for open-hearth steel, and 1.85c., Youngstown, for bar iron. The structural market is still an enigma. The buying has been comparatively light, because the general building activity seems to be lighter than it has been hoped. Some sizes of shapes are easier to obtain, and prompt shipments are possible, but assorted orders will demand longer time. Prices are unchanged at 1.60c., Pittsburg, from the larger mills; 1.70c.@ 1.85c. from the smaller mills, and 2.25c. out of stock. Plates have been quiet, with heavy specifications on old contracts. The prices remain unchanged at 1.60c., Pittsburg, from the larger mills, and 2c. from the smaller mills, some concessions being made from that figure, however. Sheets have been strong, with steady buying, and with the market strong. The base price is still 3.10@3.25c. for No. 27 black sheets out of stock.

Old Material.—The buying of scrap has been steady, but without any rush, and the market is firm at former prices.

Philadelphia. April 15.

(From Our Special Correspondent.)

Pig Iron.—The recent drop in pig iron has taken this territory by surprise. The result has been to frighten buyers out of the market. Our pig iron makers who are oversold pretend to view the matter with absolute indifference. They have no iron to sell

and are, in fact, declining to quote except on a few brands, which are not the best. Bessemer pig is very strong; basic pig is also very strong, but no large transactions have been closed. Importers are rather reticent as to the outcome of the weakening tendency in foreign material. The most pronounced drop is in No. 2 foundry, and that is likely to hold. In this iron some encouraging business has been done at the decline. Just now no definite quotations can be given.

Steel Billets.—The drop in steel billets has been welcomed by consumers, but the amount of business done is surprisingly small, when we take into account the amount of material that could be sold if consumers were altogether satisfied. Our people hold to the opinion that billets are at least $1.50 per ton too high, and that this decline will still assert itself. Quite a good deal of inquiry has been made for foreign material.

Bars.—Bar iron has not weakened, in retail dealings at least. Large buyers are not doing anything at present. In steel bars there is a fair retail demand and store prices are at full card rates.

Sheets.—The sheet market is strong, as it has been for several weeks, but mill men are not able to show quite as much business.

Skelp Iron.—Skelp iron continues strong.

Merchant Steel.—The fact that shadings have been made in some kinds of merchant steel is viewed by consumers as an evidence that there will be general concessions all along the line. There is no change in quotations in retail lines.

Pipes and Tubes.—There is no shading in any business that has been transacted. A great deal of stuff is being delivered. We have not heard of much business going to the mills.

Plates.—The drop in plates is the talk of the market. Buyers are less anxious to buy this week than last. Consumers are anxious to find out what the real influences are behind the market.

Structural Material.—Structural material is regarded as the next thing to suffer, though why, no one can assign a reason. There is a great deal of business within the reach of mills.

Steel Rails.—Steel rails are strong at $28. There is something going on in which importers are interested, but the details are not ready for use. Girder rail orders of considerable magnitude have been sent to mills this week. Among the smaller orders placed for steam roads the weight of rails called for range from 70 to 90 lbs. per yard.

Old Rails.—Authorities in old rails say that the only thing standing in the way of business is the delay in getting new rails to put down. No change in quotations.

Scrap.—The only busines sof consequence heard of this week in scrap, was in heavy steel at full prices.

Pittsburg. April 14.

(*From Our Special Correspondent.*)

The pig iron market continues strong, and no shading seems likely, despite the lower prices made for Southern iron. There has been but little buying during the week of either Northern or Southern iron, but this has no effect on production, as all the merchant furnaces are far behind in deliveries and have enough business on their books to keep them in steady operation until late in the second half, if no more orders are taken. There is but little doing in forge iron, but it is not at all probable from present indications that the furnaces will meet the price of $19.85, at which Southern makers are offering forge. The Northern furnaces are about three months behind on bessemer pig, and the Southern furnaces are nearly as far behind on foundry iron. Foundries in the Pittsburg District are covered for at least three months, and are not in the market. The United States Steel Corporation is not making any move to secure second-half iron, and has not yet received the iron ordered for shipment before April 1. The furnaces contend that it had been stipulated in the contract that coke was to be furnished to make the iron, and that the coke interest of the Corporation has not furnished the coke needed. A large number of new locomotives have been delivered to the railroads here, and freight is being handled more promptly than at any time since early last fall. The furnaces in the Valleys are being operated to full capacity, and the product is being shipped more rapidly than usual. Work on the new furnaces under construction in different sections of the Pittsburg District is being pushed forward, and it is now given out with certainty that the furnaces at Donora and Clairton will be ready to blow in on the dates previously announced.

There is but little change in the steel market. Prices are firm in all lines, and the scarcity of crude steel is as great as it was a week ago, particularly as to sheet and tin plate bars. Arrangements were being made a week ago to change the National plant of the Corporation at Youngstown from steel rails to tin-bars, but the demand for rails was found to be equally urgent, and the contemplated change was deferred. The tin-plate mills of the Steel Corporation are supplied with bars, but little is available for the independent mills. Sheets and tin-plate have become firmer, and it is reported that in some instances urgent orders have commanded a premium. The American Tin-Plate Company is said to be sold up to August 1, and is not quoting prices beyond that time. The combine is now operating all but three of its mills, and it was not expected that these mills would ever be operated when they were closed last summer. Jobbers who have stocks of tin-plate are getting from 15 to 25c. premium over the official price. Specifications on steel bars are coming in, and the mills are kept busy, but no new contracts are being made. The plate mills are still booking large orders. The demand for structural material is not falling off apparently, despite the strike of structural iron workers against the American Bridge Company, and a probable general strike on May 1, when the new wage scale goes into effect. There is no change in the strike situation, except information received at the workers' headquarters from New York that the leaders are endeavoring to obtain a conference with the officers of the bridge combine, and expect to succeed. The company is proceeding with its contracts in this district, but the work is slow, owing to the inability to get workmen.

The Pittsburg delegates to the twenty-eighth annual convention of the Amalgamated Association of Iron, Steel and Tin Workers left yesterday for Columbus, where the meeting opened this morning. It has developed that the delegates who were instructed to urge the removal of the limit in sheet and tin-plate mills will not be strong enough to carry the point, unless the officers are able to convince the convention that it is absolutely necessary in order to avoid a conflict with the manufacturers upon the expiration of the present scale on June 30. The wage committee has been at work since Friday preparing a report that will be presented at an early date. Contrary to expectations a number of the lodges have submitted demands for an advance. The puddlers want an additional increase after the price of bar iron goes above 1.7c. a pound, and the skilled workmen in the sheet mills are asking for a raise of 10 per cent. The tin-plate workers do not ask for an advance, but insist that the rebate on tin-plate for export trade be removed. Outside of wages, an unusual number of suggestions of changes have been made. If the delegates are able to carry out instructions from their lodges 85 changes will be made in the constitution and 2 in the ritual. In the memorandum of agreement, 12 changes are suggested; 51 in the boiling scale, 13 in the muck or puddle mill, 16 in busheling on sand bottom, 20 in bar and 12-in. mills, 33 in guide, 10-in. and cotton tie mills; 5 in sheet mills and 26 in the tin-plate scale. Among the changes desired in the constitution is one that will prevent any member of the association holding stock in any company by which he is employed. This is intended to show opposition to the profit sharing plan introduced by the United States Steel Corporation. When the new wage scale is adopted by the convention arrangements will be made for holding conferences with the manufacturers.

Pig Iron.—The market is quiet this week, no sales of any consequence having been made. Bessemer is held firmly at $20, Valley furnaces, for second-half delivery, and $21 for shipment before July 1. No. 2 foundry iron is quoted at $21.50@$22, for second half, while the same grade of Southern iron is offered at $21.35, but time of shipment is uncertain. Gray forge is still held at $20.50. Pittsburg and Southern forge can be bought at $19.85.

Steel.—Bessemer billets are still scarce, and sales during the week did not aggregate 1,000 tons, the price ranging from $30.50 to $31.50, delivered at Pittsburg. Open-hearth billets are about $1 higher. Tank plate and steel bars remain firm at 1.60c.

Sheets.—The only change in the market is an increased demand. Some small sales were made at a premium. The leading producer continues to quote 2.75c. for No. 28 black sheets, and 3.85c. for galvanized.

Ferro-manganese.—The market continues dull, and prices unchanged. English ferro-manganese is still quoted at $50@$52.50.

New York. April 16.

Pig Iron.—Demand is fairly strong, and several good sized sales are reported. We quote for early delivery, Northern iron at tidewater: No. 1X foundry, $22.50; No. 2X, $21; No. 2 plain, $20.50. For Southern iron on dock, New York: No. 1 foundry, $21.75; No. 2, $20.75; No. 3, $20.25.

Bar Iron and Steel.—We continue to quote for large lots on dock: Refined bars, 1.95@2c.; soft steel bars, 1.80@1.90c.

Plates.—Demand locally is limited by the disposition of shipyards and contractors not to buy until after May 1, owing to the attitude of labor organizations. Tank, ¼-in. and heavier, is quoted at 1.85@1.95c.; flange, 1.95@2c.

Steel Rails.—The quotation remains $28 for standard sections, f.o.b. mills for 1903 delivery; light rails, $32@$36, according to weight. Relaying rails are $28@$30 for heavy sections and $33@$35 for light sections.

Structural Material.—Demand for structural material is fairly good. We quote for large lots at tidewater: Beams, angles, channels and tees, 1.75@2c.

Cartagena, Spain. March 28.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—Since last report shipments have been one cargo, 2,500 tons, magnetic ore, and one cargo, 2,450 tons, manganiferous ore, both to British ports. The iron ore market continues firm and there is a good demand for all classes of ores. Freights are somewhat stiffer and not much chartering has been done for prompt shipments.

Prices are firm at 6s. 9d.@7s. per ton, f.o.b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 10s. 6d. per ton. Shipments for the week were 710 tons to Benoa, Italy, and 1,630 tons to Brunswick, Ga., U. S. A.

CHEMICALS AND MINERALS.

(See also Prices-Current on page 620.)

New York, April 16.

Consumptive demand continues good, with the result that prices for manufactured products are stronger, and in some cases are likely to advance.

The last chapter in the checkered career of the asphalt combinations in America is about to be closed. On May 15 the assets, consisting of securities and real estate of the various constituent companies, will be sold in the County Court House at Jersey City to satisfy creditors. It is understood that John H. Mack, a director of the combinations and identified with the reorganization plan, will bid for all the properties. At least $6,000,000 must be realized.

Cyanide of Potassium.—Recently 4,000 lb. were exported from New York. The cyanide sent to Colombia, South America, had an average invoice value of 20c. per lb., while that forwarded to Mexico was only 18½c. Importers of the German and British article still quote up to 21c., f.o.b. New York. Less, however, will probably be taken on contracts. Evidently importers are trying to relieve the stocks in the hands of manufacturers abroad who made heavy accumulations during the suspension of gold mining in the Transvaal. Already some good sized orders have been booked in America, and the probability is that the consumption in South Dakota, Utah, Colorado and California will show an increase this year.

Bleaching Powder and Chlorine.—The market is reflecting the heavy buying by second hands during the late cutting of prices by manufacturers of bleaching powder. It is also apparent that these jobbers are compelled to make sales in order not to infringe on their speculative profits. Consequently, English prime bleach from nearby vessels is selling at $1.12½ per 100 lb., and perhaps lower (privately), while spot is nominal at $1.37½, though on a good stiff offer a fraction less could be done. Continental bleach is obtainable at $1.25, and sellers would no doubt shade this price so as to wrench an order from their British competitors. Simultaneously domestic makers of bleach are trying to supply the market, and quote $1@$1.12½ per 100 lb., f.o.b. works, according to brand and quantity. Chlorine remains unchanged at 30c. per lb., f.o.b. New York, for liquid and 10c. for water.

Copper Sulphate.—Speculators are much in evidence and are forcing prices down. Sales of foreign blue vitriol are reported at $5.25@$5.37½ per 100 lb., f.o.b. New York, while domestic is quoted at $5@$5⅛. Export trade is being satisfied around $5. Should the copper market continue to sag there is sure to be a further reaction in prices for sulphate, but not at the same ratio as the production of the latter is decreasing rather than increasing. With regard to our export trade it is interesting to note that France is now buying British copper sulphate (98 to 99 per cent) at the equivalent of $5.23@$5.34 per 100 lbs., which compares with $4.51@$4.60 early in January. This shows an advance in price in four months of about 16 per cent. Last year we exported to France from New York alone 1,088,264 lbs., which constituted about 5 per cent of the total movement to 21 countries.

Acids.—Contract deliveries absorb attention, as new orders are comparatively small.

Quotations per 100 lbs. are as below, unless other-

wise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°..	$1.50	Oxalic com'l...	$5.25@$5.50
Muriatic, 20°..	1.60	Sulphuric, 50°,	
Muriatic, 22°..	1.75	bulk, ton....	13.50@14.50
Nitric, 36°....	4.37½	Sulphuric, 60°.	1.05
Nitric, 38°....	4.75	Sulphuric, 60°,	
Nitric, 40°....	5.00	bulk, ton	18.00@20.00
Nitric, 42°....	5.37½	Sulphuric, 66°,	1.20
		bulk, ton	21.00@23.00

Brimstone.—Consumers have taken up the surplus spot supply, and so best unmixed seconds have been advanced to $22.25 per ton, while shipments are worth $22.25@$22.50. Best thirds are about 75c. less than seconds.

Pyrites.—Shipments of Spanish iron pyrites to Southern ports are increasing, owing primarily to the heavy purchases by the Virginia-Carolina Chemical Company, the fertilizer combination. At Northern ports there has been some improvement in the receipts of copper pyrites, 10,831 tons having been reported in the past two weeks, consigned principally to the Pennsylvania Salt Manufacturing Company. Imports of copper pyrites, it is worthy of note, are likely to decrease, as the Rio Tinto Company is inclined to extract the metal before shipping the ore. This policy seems wise when it is considered that the copper content of the pyrites shipped by this company last year averaged over 2.50 per cent., which was subsequently recovered and sold at a profit by those who had bought the ore on a basis of its sulphur content. Of course, there is some expense in treating the copper cinder after burning the pyrites, but at the present price of the metal the selling profit ought to be equal to if not more than the purchase price of the pyrites. Occasionally a little gold is also recovered from the cinder which adds to the profit. Another advantage to the sulphuric acid manufacturer is that he obtains the sulphur from pyrites at a much lower cost than crude brimstone imported from Sicily. The ruling prices for pyrites are as follows: Domestic pyrites, $5 per ton, for lump ore, f.o.b. mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 12@13c. per unit for lump, and 10@11c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Consumption is growing both here and abroad. Deliveries in the first quarter this year show an increase over last year of nearly 52 per cent in the United States, and 45 per cent in Europe. At this ratio the consumption in 1903 will be the largest on record. Prices, however, are lower than last year, but are higher than they were in 1901, when the record in consumption was first broken. At present the New York market stands at $2.00 per 100 lbs. for spot deliveries, and $1.87½@$1.90 for futures. These prices are likely to strengthen as consumers' stocks are light, and ocean freights promise to advance. Recently 14s. 3d. ($3.42) was booked to Hampton Roads for orders. Arrivals in the United States during the remainder of this month will likely aggregate over 14,000 long tons, the bulk being already under contract to consumers. Latest advices from the California nitrate districts state that an experimental plant will be erected this year by the American Niter Company near its properties in Death Valley, San Bernardino County. There have been further options taken on land in this State, and it is evident that stock companies will be floated, perhaps in Eastern cities and in London. It is inexpedient, however, to sell shares until the company which controls the larger deposits has produced something to prove the value of the discovery. To develop the industry satisfactorily a rigid business policy should be adopted, and all attempts at booming and floating questionable properties must be condemned.

Chilean Nitrate of Soda Market.—Messrs. Jackson Brothers, of Valparaiso, write as follows, under date of March 7: Due to an increased consumption in Europe there has been an active demand, both for ordinary and refined. Transactions amounted to over 1,500,000 qtls. during the fortnight. The sales of 95 per cent have been effected for March to May at 6s. 3d.@6s. 4d.; June, 6s. 3d.@6s. 4½d, and July to December, 6s. 4½d.@6s. 5d., alongside. For refined, 6s. 6½d.@6s. 7½d., has been paid for March and April delivery. Exports in January and February amounted to 5,200,000 qtls., as against 4,018,000 qtls. in the corresponding period last year. We quote 95 per cent March and April, 6s. 3½d.; May and June, 6s. 4d.; July to December, 6s. 4½d.; and 96 per cent, April and May, 6s. 7½d.; July to December, 6s. 6½d., all ordinary terms sellers. The price of 6s. 3½d., with an all-round freight of 12s. 6d., stands in 7s. 7½d., net, cost and freight, without purchasing commission.

Sulphate of Ammonia.—Gas liquor is in a strong position, primarily because importers have to meet a firmer market abroad owing to the increased consumption. Quotations, f.o.b. New York, are $3.15 per 100 lbs. for spot and early arrivals, while futures bring as much as $3.25.

Phosphates.—Superphosphate manufacturers abroad report that sellers of American and African phosphates are asking higher prices with the hope of resurrecting their market as the former season's contracts have yielded little profit. On the other hand, exporters are confronted with firmer ocean freight rates, recent charters from Florida to Continental ports being based on 14s. ($3.36). Exports from Fernandina in March amounted to 11,160 tons high-grade rock, making a total of 23,000 tons for the first quarter this year, against 38,860 tons in the corresponding period last year. The decrease of 15,770 tons this year has nearly been made up by the increased shipments through Savannah.

Phosphate prices are as follows:

Phosphates	Per ton F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (78@80%)	$6.50@$7.00	6⅝@7¼d.	$10.47@11.46
*Fla. land peb. (68@73%)..	3.25@ 3.50	5⅛@5¾d.	7.70@ 8.05
†Tenn., (78@82%) export..	3.75@ 4.00	6⅝@7d.	10.20@11.20
†Tenn., 78% domestic.....	3.25@ 3.50	.....	.....
†Tenn., 75% domestic.....	3.00@ 3.25	.....	.....
†Tenn., 73@74% domestic...	2.50@ 275	.....	.....
†Tenn., 70@72% domestic...	2.25@ 2.50	.....	.....
‡So. Car. land rock.....	....@ 3.25	.....	.....
‡S. Car. riv. r'k (55@60%)	2.75@ 3.00	5⅛@5⅝d.	5.95@ 6.24
Algerian (63@68%)	.....	5¼@6¼d.	6.83@ 8.02
Algerian (58@63%)	.....	5¼@6d.	6.15@ 7.26
Algerian (53@58%)	.....	4⅞@5d.	5.41@ 5.55
Gafsa (Tunis)	.....	4⅞@5d.	5.41@ 5.55
Christmas Is. (80@85%)..	.....	7⅛@7⅝d.	11.76@12.58

* Fernandina, Tampa, Brunswick or Savannah.
† Mt. Pleasant. ‡ On vessels, Ashley River.

Liverpool April 1.

(*Special Report of Joseph P. Brunner & Co.*)

Soda Ash is firm at the usual range as to destination. For tierces, nearest values are about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton, net cash. Ammonia asn, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s. @£4 15s. per ton, net cash. Bags, 5s. per ton under price for tierces.

Caustic Soda is rather quiet, but quotations are firm, as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s per ton, net cash. Special terms for the Continent and a few other export quarters.

Bleaching Powder is very slow as regards fresh orders, buyers having plenty. For hardwood, £4@ £4 5s. per ton, net cash, is about nominal range, but quotations vary as to destination.

Chlorate of Potash is without special feature, and is quoted at 2⅞@3d. per lb., net cash.

Bicarb. Soda is selling at £6 15s. per ton, less 2½ per cent, for the finest quality in 1-cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of Ammonia is maintained at £13 12s. 6d. @£13 15s. per ton, less 2½ per cent for good gray 24@25 per cent in double bags, f.o.b. here.

Nitrate of Soda is selling fairly on spot at £9 10s.@ £9 12s. 6d. per ton, less 2½ per cent for double bags, f.o.b. here, as to quality.

METAL MARKET.

New York, April 16.

Gold and Silver Exports and Imports.

At all United States Ports in March and Year.

Metal	March. 1902.	March. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports...	$4,432,946	$1,042,508	$15,672,101	$2,826,111
Imports....	2,636,313	4,472,081	6,739,067	8,031,666
Excess.	E. $1,796,633	I. $3,429,463	E. $9,333,034	I. $5,495,555
Silver:				
Exports ...	$3,301,291	$3,063,749	$11,751,886	$11,107,679
Imports....	2,306,499	1,479,771	6,419,823	5,060,743
Excess.	E. $994,792	E. $2,183,978	E. $5,332,063	E. $6,046,936

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending April 15, and for years from January 1:

Period.	Gold. Exports	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess. Exports or Imports.
Week ...	$ 31,500	$10,995	$272,925	$39,416	E. $254,014
1903.....	1,347,450	2,516,892	5,630,795	375 618	E. 4,075,740
1902.....	16,419,384	1,014,343	10,057,324	494,332	E. 25,038 053
1901.....	10,818,269	870.054	11,240,138	1,231,918	E. 19.957,135

Financial Notes of the Week.

Wall Street has shown extreme depression under the joint influence of high rates for money and the adverse decision in the Northern Securities case. The effect of this depression on general business has been comparatively slight so far and trade remains good. The labor troubles in different trades are, however, having a depressing influence.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending April 11, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts..	$899,956,000	$900,381,800	$902,979,500
Deposits	969,289,200	957,361,400	884,830,800
Circulation	31,479,000	30,920,000	43,126,400
Specie	180,642,100	171,999,800	158,954,700
Legal tenders	69,618,400	71,916,300	65,994,300
Total reserve	$250,260,500	$243,912,100	$224,949,000
Legal requirements ..	242,322,300	239,340,350	221,207,700
Balance surplus ..	$7,938,200	$4,571,750	$3,741,300

Changes for the week, this year, were increases of $155,000 in circulation, $808,500 in specie, and $1,-610,475 in surplus reserve; decreases of $1,205,400 in loans and discounts, $3,931,500 in deposits, and $180,-900 in legal tenders.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd	$171,999,800	.....	$158,954,700	.....
England ...	176,223,310	.....	171,751,600	.....
France	510,337,745	$220,875,705	501,184,965	$219,694,315
Germany ...	177,015,000	65,470,000	151,420,000	53,200,000
Spain	70,405,000	91,095,000	72,330,000	101,415,000
Neth'l'ds ..	23,911,000	32,592,500	19,678,000	32,930,500
Belgium ...	16,160,000	8,080,000	16,060,000	8,030,000
Italy	80,645,000	10,641,500	88,575,000	11,369,500
Russia	367,610,000	41,125,000	386,615,000	42,175,000

The returns of the Associated Banks of New York are of date April 11, and the others April 10, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Silver has been poor, owing to a French tender for 1,500,000 oz. It has not yet been ascertained whether this purchase has been made, but it will probably be executed around current figures. The market closes to-day at 23 1-16d.

The United States Assay Office in New York reports receipts of 32,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to April 2 are reported by Messrs. Pixley & Abell's circular, as follows:

	1902.	1903.	Changes.
India	£1,974,085	£2,067,500	I. £93,415
China	16,500	106,500	I. 90,000
The Straits	250	128,491	I. 128,241
Total	£1,990,835	£2,302,491	I. £311,656

Receipts for the week were £114,000 in bar silver from New York, and £3,000 from Australia; total, £117,000. Shipments were £84,300 in bar silver from Bombay and £15,000 from Calcutta; total, £99,300.

Indian Exchange is easy, and the Council bills offered in London were taken at an average of 15.97d. per rupee. Buying of silver for India has been checked by the higher prices of the metal.

The exports of merchandise from the United States in March were heavy, reaching a total value of $131,-951,579. For the nine months of the fiscal year from July 1 to March 31 the statement is as follows:

	1902.	1903.
Exports	$1,080,987,514	$1,114,055,067
Imports	678,694,539	776,970,274
Excess, exports	$402,292,975	$337,084,793
Add excess of exports, silver.....		19,009,533
Total		$356,094,326
Deduct excess of imports, gold		20,917,068
Apparent balance		$335,177,258

The gold and silver movement in detail will be found at the head of this column.

The movement of gold and silver in France for the two months ending February 28 is reported as follows:

	1902.	1903.	Changes.
Gold:			
Imports	Fr. 55,411,000	Fr. 60,954,000	I. Fr. 5,543,000
Exports	11,097,000	9,719,000	D. 1,378,000
Exc., imp'ts	Fr. 44.314.000	Fr. 51.235,000	I. Fr. 6,921,000
Silver:			
Imports	15.188.000	11.878,000	D. 3.310,000
Exports	15.206.000	10,836,000	D. 4,370,000
Excess ...	E. Fr. 18,000	I. Fr. 1,042,000	.....

Imports of copper and nickel coins, rated at their face value, were 14,000 fr., against 18,000 fr. in 1902. Exports were 17,000 fr., against 909,000 fr. last year.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$.39	$ 40½
Peruvian soles and Chilean pesos	.36	.39
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	3.88
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

April.	Silver—Sterling Exchange	Silver—N. Y. Cts.	Copper—London, Pence.	Copper—Lake, Cts. per lb.	Copper—Electrolytic, Cts. per lb.	Copper—London, £ per ton.	Tin, Cts. per lb.	Lead Cts. per lb.	Spelter—N. Y. Cts. per lb.	Spelter—S. L., Cts. per lb.
9	4.86½	49¼	22¾	14⅜ @14⅝ 14⅜	14¼ @14½ 14¼	61¼	29½	4.60 @4.65 4.60	5.50	5.32½
10	4.86½	49¼	...	14⅜ @14⅝ 14⅜	14¼ @14½ 14¼	....	29⅝	4.60 @4.65 4.60	5.50	5.32½
11	4.86½	49⅜	22½	14½ @14⅝ 14½	14¼ @14½ 14¼	....	29¾	4.60 @4.65 4.60	5.50	5.32½
13	4.86½	49⅜	....	14¾ @14⅞ 14½	14⅜ @14½ 14⅜	....	29⅝	4.60 @4.65 4.60	5.55	5.37½
14	4.86½	49¾	22½	14¾ @14⅞ 14⅝	14⅜ @14½ 14⅜	62½ 62¾ 63	29⅜ @29⅝ 29½ @29¾	4.60 @4.65 4.60	5.55	5.37½
15	4.86½	50	23	14⅞ @14⅞	14½ @14⅝	@	@29¾	@4.65	5.55	5.37½

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures

Copper.—During the week under review, the market has had more or less a holiday aspect, and transactions were very few and far between. While first hands appear to be well sold ahead and are not pressing any metal for sale, consumers have adopted a waiting attitude. At the close there is a somewhat better feeling, and we quote lake copper at 14⅝@14⅞c.; electrolytic in ingots, cakes and wirebars, 14¾@14⅝c.; cathodes, 14⅛@14⅜c.; casting copper, 14@14¼c.

The market for standard copper in London, which closed last Thursday at £61 15s., opened on Tuesday at £62 10s., and the closing quotations on Wednesday are cabled as £63 for spot and £63 2s. 6d. for three months prompt.

Refined and manufactured sorts we quote: English tough, £67@£68; best selected, £68 10s.@£69 10s.; strong sheets, £76@£77; India sheets, £73 10s.@£74 10s.; yellow metal, 6⅜@6½d.

Exports and imports of copper at New York, Philadelphia and Baltimore in the week ending April 14, and for the year to date, are reported by our special correspondents as follows, in long tons:

Exports:	Week.	Year.
Austria	....	1,796
Belgium	....	611
France	65	7,438
Germany	160	6,556
Holland	973	12,902
Italy	....	825
United Kingdom	932	5,217
Other countries	20	1,541
Total copper	2,150	36,886
Matte	....	78
Imports:		
Copper	1,179	7,504
Matte	....	300

The exports were less than last week, but imports show an increase. It is noteworthy that 492 tons copper have been received direct from Chile—the first lot in a long while.

Imports and exports of copper in Germany for the two months ending February 28 were, in metric tons:

	1902.	1903.	Changes.
Imports	9,092	11,904	I. 2,812
Exports	697	866	I. 169
Balance, imports	8,395	11,038	I. 2,643

Imports of copper ore were 796 tons, against 572 tons in 1901; while exports were 2,388 tons, against 1,527 tons last year.

Chilean Copper Market.—Messrs. Jackson Brothers write from Valparaiso, Chile, under date of March 28, that recent sales of bar copper amounted to 15,873 quintals, at an average of $36.30, Chilean currency, per Spanish quintal. Sales of matte were about 100 tons, at an average of $15.80 per quintal, basis of 50 per cent. A small lot of ore—about 100 tons—was sold for export at $4.80, Chilean, basis of 10 per cent.

Tin has ruled quiet but steady throughout the week. There is a somewhat better inquiry on the part of consumers. At the close we quote spot and futures 29½@29¾c.

The foreign market, which closed last Thursday at £135 7s. 6d., opened on Tuesday at £135 15s., and the closing quotations on Wednesday are cabled as £135 10s.@£136 12s. 6d. for spot and £135 12s. 6d.@£135 15s. for three months.

Shipments from the Straits during the first-half of April are advised as 1,200 tons.

Lead is quiet but firm, without any special features. Quotations are unchanged at 4.52½@4.57½c., St. Louis, and 4.60c., New York.

The foreign market is somewhat firmer, Spanish lead being quoted £12 12s. 6d.@£12 15s., and English lead, £12 15s.@£12 17s. 6d.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of March 28, that the price of silver for the week has been 12 reales per ounce. The exchange has gone up 13 centimes, making it 33.73 pesetas to £1. The local quotation for pig lead on wharf has been 73.50 reales per quintal on wharf, which on above exchange is equal to £12 3s. 11d. per ton of 2,240 lb., f.o.b. Cartagena. Exports of pig lead for the week were 50,000 kgs. to Marseilles.

Spelter has been quiet but firm throughout the week, and nothing of special interest has transpired. At the close we quote 5.37½c., St. Louis, and 5.55c., New York.

The foreign market is unchanged, good ordinaries being quoted at £22 10s., and specials at £22 15s.

Silesian Spelter Market.—Herr Paul Speier reports from Breslau, Silesia, under date of March 30, that business has been good and prices firm. Quotations were 23@23.50 marks per 50 kgs., f.o.b. cars Breslau; which is equal to 4.93c. per lb. Imports and exports in Germany for January are reported as below, in metric tons:

	—Imports.— 1902.	1903	—Exports.— 1902.	1903.
Spelter	3,394	2,629	10,018	9,987
Zinc sheets	27	4	2,539	2,331
Zinc scrap	146	220	285	593
Zinc ore	7,799	7,276	10,039	7,320
Zinc-white	338	447	2,728	2,114
Lithophone	13	6	1,252	1,175

Zinc dust is quoted at 19.50@19.75 marks per 50 kgs., f.o.b. works; equal to 4.29c. per lb.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of March 28, that blende continues firm, notwithstanding that spelter prices have fallen since the last report; no doubt, however, if spelter continues its downward course during the next few days prices will be offered for blende here considerably lower than the high rates they have lately fetched in this sierra. Exports for the week have been 3,379 tons blende to Antwerp.

Antimony remains quiet but steady. We quote: Cookson's, 8¼c.; Hallett's, 6⅞c.; Hungarian, French, Italian, United States and Japanese, 6½@6⅝c.

Nickel.—The price is now quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 72½c. per gram.

Quicksilver.—The New York price is 50c. higher at $47.50 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotation is still $44.50@$46 per flask for domestic orders, and $42@$43 for export. The London price is £8 12s. 6d. per flask, with the same quotation from second hands.

Minor Metals and Alloys.—Wholesale prices, f.o.b. works, are as follows:

Aluminum.	Per lb.
No. 1, 99% ingots	33@37c.
No. 2, 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N.Y.)	80c.
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25%, N. Y.)	55c.
Ferro-Tungsten (37%)	28c.
Magnesium	$2.75
Manganese, pure (N.Y.)	60c.
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus	45c.
American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

New York Metal Exchange.—Upon recommendation of the Copper Committee, the board of managers of the New York Metal Exchange, at its meeting April 9, adopted the following amendments to the Copper Rules, to go into force on April 20:

The call for electrolytic copper shall be for electrolytically refined copper only, and as follows: (1) Spot, on which deliveries shall be made in ingots or ingot-bars. (2) One month delivery from date, seller's option. Buyer to give specification within 48 hours, whether delivery shall be made in ingots, ingot-bars, cakes or wire-bars of usual sizes. (3) The months in their order, except the current month, which shall not be called.

On contracts for future delivery, deliveries shall be made in ingots, ingot-bars, cakes or wirebars of usual sizes, buyer's option. Buyers to give specifications 20 days before the earliest date of delivery if so required, or at least 20 days before the latest date of delivery. Sellers shall have the right to deliver ingot or ingot-bars, if no specification is forthcoming when demanded.

Future deliveries shall be made in store, or f.o.b. New York lighterage limits, buyer's option. Buyer to express his option as to "store" or "lighterage free" delivery at the time when specification is given.

Missouri Zinc Ore Market. April 11.

(From Our Special Correspondent.)

This week's shipment of zinc was 1,973 tons—nearly 2,000 tons larger than the average shipment for the fourteen preceding weeks of the year. The result is that the reserve stock is pretty well taken up. There is left but one accumulation of any size, and this belongs to the New Jersey Zinc Company, and cannot be classed as a marketable ore, because this company is itself a smelter of zinc ore. One 500-ton lot at Prosperity was cleaned up during the week, and several bins were nearly cleaned up at Alba and Neck. It was the largest shipment of zinc in one week since October of last year, and the value of the shipment was greater than the larger shipment of both zinc and lead the week ending October 11, because zinc is now $2.50 and lead $10 per ton higuer than it was then. Compared with a year ago zinc is $7 and lead $16 per ton higher. The highest price paid during the week was $42 per ton for two lots of zinc ore and $60 per ton for choice lots of lead ore in the bin. At $42 at least one of the high-priced bins of ore sold equivalent to a basis of $39 per ton, and the basis price ranged from this down to $36 on various grades of ore. In fact, each buyer had his own basis, and each one regulated it according to the necessity of the occasion, in order to secure a proportion of the mineral marketed. While some lead sold at $60 per ton in the bin, the gerater amount sold at $59.50, delivered at the local smelting works. There was a time in this district when lead buyers had a price regulated each week by the St. Louis pig lead quotations, but nothing of this kind is traceable now, and has not been for about two years. As there is now a very low smelting charge between the price paid for the mineral and the quoted price of pig lead; but for more than a year the lead smelters had a wide range of margins from $7 to $19 per ton. The $7 figure is the old rate of deducting for smelting charges, a rule that was followed here for over 25 years, and that was all that was deducted in a settlement with the miner; but this is no longer a rule, and the lead buyer purchases the ore at as low a figure as he can persuade the producer to part with it.

Following are the shipments of zinc and lead from the various camps of the Joplin District for the week ending April 11, 1903:

	Zinc. Pounds.	Lead. Pounds.	Total Value.
Joplin	3,162,180	448,790	$86,598
Carterville & Webb City	2,229,700	310,820	50,496
Duenweg	984,220	285,560	27,195
Prosperity	1,185,500	14,040	22,943
Alba and Neck	1,189,360	.....	22,598
Galena and Empire	1,035,750	119,120	22,496
Aurora	899,200	16,940	15,200
Oronogo	418,040	10,340	7,800
Carthage	379,760	.....	7,405
Granby	331,000	44,000	5,508
Spurgeon & Spring City	188,610	37,810	4,143
Zincite	197,960	2,600	3,893
Reeds	195,750	.....	3,524
Carl Junction	173,780	.....	3,476
Mitchell	119,960	10,580	2,714
Central City	125,380	16,240	2,449
Diamond	88,270	.....	1,677
Cave Springs	64,260	9,110	1,620
Wentworth	48,130	.....	813
Totals	13,016,810	1,325,950	$292,499
Total 15 weeks	140,039,810	15,682,820	$2,730,708

It will be seen that the shipments of the week under review are considerably above the average for the 15 weeks, both in quantity and value.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	....	27.77	....	4.075	....	4.37
May	....	29.85	....	4.075	....	4.47
June	....	29.36	....	4.075	....	4.96
July	....	28.38	....	4.075	....	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.38
November	....	25.68	....	4.075	....	5.18
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.069	....	4.84

Note.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.861c.; for March, 5.174c.

Average Prices of Copper.

Month.	New York Electrolytic. 1903.	New York Electrolytic. 1902.	New York Lake. 1903.	New York Lake. 1902.	London Standard. 1903.	London Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	.....	11.618	.....	11.986	....	52.79
May	.....	11.856	.....	12.226	....	54.03
June	.....	12.110	.....	12.360	....	53.93
July	.....	11.771	.....	11.923	....	52.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.760	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.08
December	.....	11.430	.....	11.590	....	50.95
Year	.....	11.626	.....	11.887	....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London. Pence.	1903. N. Y. Cents.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.
January	21.98	47.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.63
April	....	....	24.34	52.72	27.30	59.29
May	....	....	23.71	51.31	27.43	59.64
June	....	....	24.17	52.36	27.42	59.57
July	....	....	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.03	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
†Alaska Treadwell	April 28	.37½	$75,000	$5,270,000
†Allis-Chalmers, pf.	May 1	1.75	284,375	2,775,000
*Bartolome, Mex.	April 30	.58	1,155	69,258
*Cinco Senores, Mex.	April. 30	3.85	7,700	686,735
Gold King Con., Colo.	April 20	.02	18,737	430,951
*Home Oil, Cal.	April 20	.07½	7,500	480,000
*Homestake, S. D.	April 25	.25	54,600	11,930,550
Iron Silver, Colo.	May 1	.10	50,000	2,750,000
*Natividad, Mex.	April 23	3.08	7,392	184,026
*Pacific Coast Borax	April 29	1.00	19,000	1,293,500
Penna. Steel, pf.	May 1	3.50	577,500	2,601,250
†Phila. Gas, common	May 1	1.50	231,406	2,954,019
*San Rafael, aviador, Mex.	Apr. 16	9.24	11,088	.....
*San Rafael, aviada, Mex.	April 16	3.48	4,316	.....
*Soledad, Mex.	April 16	3.85	3,696	231,400
*St. Gertrudis, y An., Mex.	Apr. 26	.77	22,176	2,702,568
†Tenn. Coal, Iron & R.R.	May 1	2.00	4,960	297,135
†Texas & Pacific Coal.	April 25	1.50	30,000	2,100,000
†U. S. Steel, common	June 9	1.00	5,083,025	45,726,552
†U. S. Steel, pf.	May 15	1.75	8,929,919	80,332,910
†Vindicator Con., Colo.	April 25	.03	33,000	1,027,000
Vindicator Con., extra	April 25	.02	22,000	.....

* Monthly. † Quarterly. § Semi-annual.

ASSESSMENTS.

Name of Company.	Location. No.	Delinq.	Sale.	Amt.
Alaska	Utah ..	Apr. 14	Apr. 30	.03
Alma	Cal. ..	Apr. 27	.....	.15
Caledonia	Nev. ..	Apr. 15	May 4	.15
Century	Utah ..	Apr. 19	May 18	.10
Con. New York	Nev. 17	Apr. 7	Apr. 28	.05
Fremont Con.	Cal. ..	Apr. 20	.....	.20
Gould & Curry	Nev. ..	Apr. 17	May 6	.15
Hale & Norcross	Nev. 12	Apr. 30	May 28	.10
Kennedy	Cal. ..	Apr. 20	.....	1.00
Kentuck Con.	Nev. ..	May 6	May 29	.05
Kern Canyon Oil	Cal. ..	Apr. 27	.....	.06
Maple	Utah 8	Apr. 20	May 8	.00½
Morning Star	Nev. ..	May 1	May 21	.00½
National Con.	Cal. 17	May 4	May 30	.05
Ophir	Nev. ..	Apr. 10	Apr. 30	.15
Overman	Nev. 12	April 7	April 28	.10
Provident Oil	Cal. ..	May 7	.....	.03½
Seg. Belcher & Mides	Nev. ..	May 5	May 25	.05
Silver Shield	Utah 4	Apr. 28	May 15	.02
Sonora	Mex. ..	May 6	.....	.01
Tonopah & Salt Lake	Nev. 1	Mar. 28	Apr. 17	.10
Wabash	Utah 2	Apr. 21	May 14	.05
Yellow Jacket	Nev. ..	Apr. 30	June 5	.15

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	Apr. 8. H.	Apr. 8. L.	Apr. 9. H.	Apr. 9. L.	Apr. 10. H.	Apr. 10. L.	Apr. 11. H.	Apr. 11. L.	Apr. 13. H.	Apr. 13. L.	Apr. 14. H.	Apr. 14. L.	Sales
Acacia, Colo	$1													
Alice, Mont.	25									28				50
Amalgamated c., Mont	100	64¼	62⅛	64⅜	63					64¼	60	62⅜	60¼	152365
†Anaconda c. Mont.	25	106½	105⅝							106	100⅛	108	104	4,000
Anaconda Gold, Colo.	5			.18	.17							.18		1,300
Best & Belcher, Nev.	3													
Brunswick, Cal.	1											2.40		100
Chollar, Nev.	3			.26						.36		.30		1,400
Chrysolite, Colo.	50											.06		500
C. K. & N., Colo.	1											.20		100
Comstock T., s., Nev.	2	.10	.08	.08½								.08½	.07	8,190
Comst T. Bonds	100													
Con. Cal. & Va., g.s. Nev	2½	1.50		1.45						1.60				550
Cons. Imperial, Colo.	1	.04												1,000
Cripple Creek c., Colo.	1													
Elkton g., Colo.	1	.37										.37		2,000
Gold Dollar, Colo.	1													
Gould & Curry, Nev.	3													
Greene Con., c., Mex.	10	24	23¾	24	23⅞					24¼	23¼	23⅜	22	17,300
Hale & Norcross	3													
Homestake, S. Dak.	100	65												30
Isabella, g., Colo.	1			.18						.19		17½		1,200
Jack Pot, Colo	1									.11				400
Leadville, Colo.	10	.18		.04										900
Little Chief, Colo.	1									.09				300
Mexican, Nev.	3	.88		1.00										400
Mollie Gibson, Colo.	5			.07¼										2,000
Occidental, Nev.	1			.45										500
Ontario, Utah	100									5.50		5.60	5.40	350
Ophir, s., Nev	1			1.50						1.90				310
Pharmacist, Colo.	1	.04½												500
Phœnix, Ariz.	1													
Portland, Colo	10	1.40												600
Potosi, Nev.	3			.22						.28				600
Quicksilver, pfd.	100													
Savage, Nev.	2½													
Silver Hill, Nev	1									.72		.80		300
Small Hopes, Colo.	20									.52				200
Standard, Cal.	10													
Tenn. c., Tenn	25	2.95	2.90	2.95						2.90	2.90	3.00	2.97½	1,500
Union Con., Nev.	2½													
Union Con., N. C.	10	2⅜		2⅜						2⅜		2¼		1,000
White Knob, g. s., Ida	100	11.42	11	11.85	11.45					11.85				800
Work, Colo.	1			.06½	.06									5,000
Yellow Jacket, Nev.	3											.30		40

Total sales 206,085 shares.

BOSTON, MASS.*

Name of Company.	par val	Shares listed.	Apr. 8. H.	Apr. 8. L.	Apr. 9. H.	Apr. 9. L.	Apr. 10. H.	Apr. 10. L.	Apr. 11. H.	Apr. 11. L.	Apr. 13. H	Apr. 13. L.	Apr. 14. H.	Apr. 14. L.	Sales
Adventure Con., c.	$25	100,000	10		10						10½	9½	9½		457
Aetna Cons., g.	5	500,000													
Allouez	25	80,000	6⅞	6⅞	7	6⅝					7	5⅝	6¼	5⅞	4,446
Amalgamated, c.	100	1,538,879	64⅜	62⅛	64⅛	63					64⅛	60¼	62⅝	60¼	29,056
Am. Z. L. & Sm.	25	60,000	10		10						10		10		400
Anaconda, c.	25	1,200,000	28¼										26		150
Arcadian, c.	25	150,000	3¾		4						3¾	3½			335
Arnold	25	60,000			.25								.75		112
Atlantic, c.	25	100,000			11¾								11¾		533
Bingham Con., g. s.	50	150,000	30½	30	30½	30					29¾	29	29	28½	1,585
Bonanza	10	300,000	.70		.70						.70				648
British Columbia	15	250,000													
Cal. & Hecla, c.	25	100,000	525	520	520						520		520	515	66
Catalpa	10	300,000													
Centennial, c.	25	90,000	24	24	24½	23					22	20⅛	22	20½	5,724
Con. Mercur, g.	5	1,000,000	†1 27/32		†1 29/32	1¾							1 27/32	1¾	2,230
Continental Zinc	25	22,000											14		8
Copper Range Con.	100	285,000	61¾	60½	61¾	60					61	58	58¼	56¼	10,549
Daly-West., g. s.	20	180,000	44	43	44	43½							43	41⅝	965
Dominion Coal	100	150,000	107¾	107	108¼						112	106			329
Dominion Coal, pf.	100	30,000									116				5
Dominion I. & S.	100	100,000	26½		27	26¾					28¼	25⅝			2,388
Elm River	12	100,000									3½		3½	3¼	620
Franklin, c.	25	100,000											19		375
Guanajuato, Con.	5	385,000									1⅝	1½	1¾	1¾	2,000
Isle Royale Con., c.	25	385,000			12	11¾					11	10¾	11		545
Mass Con., c.	25	100,000	‡10½	10	‡10¼	10					‡10	9¾	9¾	9½	1,218
Mayflower, c.	25	100,000	2												50
Michigan, c.	25	100,000	9¼	9							10¼	8¼	8¾	8	260
Mohawk, c.	25	100,000	51	50	51	50¼					50		48¾	46½	2,109
Mont. Coal & Coke	25	200,000	7												60
Mont'l & Boston, c.	5	570,000													
National	25	100,000									1¼				50
New Idria, g.	5	100,000													
Old Colony, c.	25	100,000													
Old Dominion, c.	25	150,000	18	17⅛									17¾	17	370
Osceola, c.	25	96,150	67	64	68¼	67					67		66	64	1,615
Parrot, s. c.	10	229,850	27	26¾	28¼	27					26¾	26½	26¼	25¾	656
Phoenix Con., c.	25	100,000	5⅜	5¼	5¼						5⅝		5⅝	5¼	530
Quincy, c.	25	100,000	115								114	110	115	112	193
Rhode Island, c.	25	100,000	2⅜												100
Santa Fe, g. c.	10	250,000	2												100
Shannon, c.	10	183,286			13⅜	13					13	12⅝	13	12¾	2,070
Tamarack, c.	25	90,000	147	145	145	140					140		140		177
Tecumseh	25	80,000	1		1						1				350
Trimountain	25	100,000	90	89	90						89	87½	90	86	935
Trinity, c.	25	100,000	9¾	9¼	9¾	9½					9½	9	9	8¾	2,748
United Copper	100	450,000											23		100
United States, g.	25	419,000	24¼	23¾											8,380
U. S. Coal & Oil	25	240,000									14½	13¾	14	13½	2,871
Utah Con., g.	5	300,000	27⅛	27	24¼	23⅞					27½		28	27	8,046
Victoria, c.	25	100,000	6	5⅝							6	5½	6	5⅝	794
Washington	25	60,000			15										10
Winona, c.	25	100,000	‡9⅜	9	‡10	9½					9¾	8¾	9¼	8⅝	3,272
Wolverine, c.	25	60,000	70		72¼	71¾					71		71	70	928
Wyandot	25	100,000	1¾								1¾	1¾	1¾		1,400

* Boston Stock Exchange. † Ex Dividend. ‡ Assessment Paid. Total sales, 102,729 shares.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val	Apr 8. H.	Apr 8. L.	Apr. 9. H.	Apr. 9. L.	Apr. 10. H.	Apr. 10. L.	Apr. 11. H.	Apr. 11. L.	Apr. 13. H.	Apr. 13. L.	Apr. 14. H.	Apr. 14. L.	Sales
Allis-Chalmers, U. S.	100			17									16	200
Allis-Chalm's, pf, U.S.	100													
Am. Agr. Chem., U.S.	100													
Am. Agr. Chem. pf, U.S.	100													
Am. Sm. & Ref., U.S.	100	48⅜	48⅛	49	48							48⅜	46⅞	49	47	15,450
Am. Sm. & Ref. pf, U.S.	100	92¾	92⅜	93								93	91¾	93	92⅛	1,750
Am. Steel & Fdy., U.S.	100													
Am. S. & Fdy. pf., U.S.	100													
Col. Fuel & I., Colo.	100	58	58¼	58¼	56⅛							57⅛	55⅜	57	55¼	13,200
Col. & H. C. & I., Colo.	100			20¼	20							19⅛	19¼	19⅛	19	1,100
†Crucible Steel, U. S.	100	18¾		18¼								18⅛	18	18¼	18	1,913
†Crucible Steel, pf, U S	100	82⅜	82⅛	83¼	82⅞							83⅛	82¼	83	82⅛	3,009
†Mong. R. Coal, Pa.	100			10¼												300
†Mong. R. Coal pf, Pa	100	39⅛	39									39⅛	39¼	39¼		595
National Lead, U.S.	100			25½	25¼							24	23	24	23	2,200
National Lead pf, U.S.	100			91¼								91¼		90		424
†Phila Nat. Gas	100	45¼	44⅜	45⅛	44⅛							44⅜	44	44⅛	44⅛	1,215
†Phila Nat. Gas, pf	100															
†Pittsburg Coal, Pa.	100			28¼	28							28¼	28	28¼		3,180
†Pittsburg Coal pf, Pa	100	91¼	90¾	91	90¼							91	90¼	‡88⅜		855
Republic I & S., U.S.	100	19⅜	19	19¾	19							19	17¾	18¼	18	5,100
Republic I. & S., pf, U.S.	100	77	76¾	77¼	77							76¾	75¾	76¼	76	1,800
Sloss-Shef S. & I., Ala.	100			56								56	55	55		1,250
Sloss-Shef S. & I. pf, Ala.	100	91¾	91	91⅝										94		400
Standard Oil, U.S.	100	670	667	670	660									658	655	168
Tenn. C. I. & R. R., Ala.	100	64	63¼	64¾	63							63¾	61	63¼	61½	16,650
U. S. Red & Ref., U. S.	100	32														100
U. S. Red & R. pf., U.S.	100															
U.S. Steel Corp., U.S.	100	35⅛	34⅜	36¼	35⅜							35⅜	34	35	33⅞	129300
U.S. Steel Corp. pf, U.S.	100	85⅝	84⅜	87	85½							85⅝	83	84¾	83⅜	99,322
Va.-Car Chem., U.S.	100	61¾	61⅜	62	61⅜							61	59½	59⅞	58⅞	4,390
Va.-Car Chem. pf, U.S.	100											121¾	121			365
Va. I. C. & Coke, U. S.	100	33	32	32⅝	32							32	30	31	30	2,800

* New York Stock Exchange. † Pittsburg Stock Exchange. ‡Ex-Dividend. Total sales, 307,036 shares.

COLORADO SPRINGS, COLO.*

Name of Company.	Par val	Apr. 6. H.	Apr. 6. L.	Apr. 7. H.	Apr. 7. L.	Apr. 8. H.	Apr. 8. L.	Apr. 9. H.	Apr. 9. L.	Apr. 10. H.	Apr. 10. L.	Apr. 11. H.	Apr. 11. L.	Sales
Acacia	$1	.09¼	.08½	.08¼	.08	.09¼	.09⅛	.09⅜	.09⅛	.09¼	.09⅛	.09⅛	.09	9,000
Am. Con.	1	.02⅝	.02⅛	.02⅝	.02⅜	.02⅝	.02⅜	.02⅝	.02½	.02⅝	.02⅛	.02⅛		6,000
Anaconda	1	.15⅜	.15½	.16	.13½	.16	.13½	.15⅝		.15⅝		.15¾		1,000
Ben Hur	1	.02¼	.02¼	.03⅜	.03	.02¼	.02	.02¼	.02	.02¼	.02	.02⅜	.02⅛	3,000
Blue Bell	1	.06						.06		.06		.06	.04	
C. C. & M.	1	.02½	.02⅛	.02⅛		.02½	.02⅛	.02⅜	.02¼	.02⅝	.02⅛	.02⅜	.02¼	6,000
C. K. & N.	1	.19	.17	.19	.17	.19	.17	.18¼		.19		.18½	.18	2,000
C. C. Con.	1	.05	.04¼	.05	.04⅜	.05	.04⅜	.05	.04¾	.05	.04⅜	.05	.04	3,000
Coriolanus	1	.04		.03¼	.03	.03¾		.04		.04		.03¾		2,000
Des Moines	1	.03½	.03	.03½	.03	.03½	.03		.02⅝		.02⅝	.04		
Dr. Jack Pot.	1	.09¾		.09½	.08¼	.09½	.08½	.09½	.08½	.09¾	.08¼	.08¾	.08½	5,000
Elkton Con.	1	.38	.36¼	.37½	.33⅞	.37½	.36⅞	.36		.38	.37	.38	.36	16,450
El Paso	1	.61¼	.59¾	.60	.59	.59		.59		.60	.58½	.59½	.58	5,000
Fannie Rawlings	1	.04	.02¼	.04	.02½	.04	.02¼	.04	.02¼	.04	.02¼	.04	.02¼	
Findley	1	.13	.12½	.15	.13	.15	.13	.15	.13	.15	.13	.14¼	.13½	2,000
Gold King	1	.05½	.05	.05¼		.05¼	.05½	.05⅝	.05	.05⅝	.05	.05⅝		5,000
Gold Dollar Con.	1													
Golden Cycle	1	.75	.73	.74	.73½	.73½		.74	.73½	.74	.73½	.74¾	.73½	5,200
Golden Fleece	1	.11	.05	.05			.05		.05		.05		.05	
Gould	1		.02½			.04¼	.03½	.04	.03½	.04	.03½	.03⅝		5,000
Hart	1		.02		.02		.02		.02	.10	.05		.02	
Isabella	1	.15½		.16¼		.15½		.16⅝	.16⅜	.16⅜	.16⅛	.16⅛	.15⅞	4,500
Jack Pot	1	.09½		.09		.09		.09	.08¼	.09	.08¼			
Last Dollar	1	.50				.50		.50		.50		.50		
Lexington	1	.05½	.04¾	.05		.04¾		.05	.04⅞	.05	.04⅞	.05		5,000
Little Puck	1	.04	.03¼	.04	.03¼	.04	.03¾	.04	.03¾	.04	.03¾	.04	.03¼	1,000
Mollie Gibson	1	.07	.05½	.07	.05½	.07	.05½	.07	.05½	.07	.05¼	.07	.05¾	
Moon Anchor	1	.09	.08	.09	.08	.09	.08	.09	.08	.09	.08	.09	.08	1,000
New Haven	1	.02⅝	.02¾	.02⅝	.02¼	.02⅝	.02¼	.02⅝	.02¼	.02⅝	.02¼	.02⅝	.02¼	2,000
Pharmacist	1		.04½		.04		.04	.04⅝	.04¼	.04⅝	.04¼	.04⅝	.04¼	2,000
Pinnacle	1	.04⅝	.04⅜	.04⅝	.04¼	.04⅝	.04¼	.04⅝	.04¼	.04⅝	.04¼	.04⅝	.04	2,000
Pointer	1													
Portland	1	1.40	1.35	1.40	1.36	1.40	1.36	1.39	1.33	1.39	1.33	1.37	1.33	3,200
Prince Albert	1	.03	.02¼	.03	.02½	.03	.02½	.02¾	.02½	.02¾	.02⅛	.02⅝	.02½	4,000
Vindicator	1	1.00	.98	1.00	.95	1.00	.95	1.05		1.05		1.00	.98	
Work	1	.07	.06	.07	.06	.07	.06	.07	.06	.07	.06	.06¾	.06¼	4,000

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 104,150 shares.

COLORADO SPRINGS. (*By Telegraph.*)

Name of Company.	Apr. 13. H.	Apr. 13. L.	Apr. 14. H.	Apr. 14. L.	Name of Company.	Apr. 13. H.	Apr. 13. L.	Apr. 14. H.	Apr. 14. L.
Acacia	.09⅛	.08⅛	.10	.08¼	Golden Cycle	.74	.73	.74	.73
Am. Con.	.02¾	.02⅝	.02⅜	.02⅝	Golden Fleece	.11	.05	.11	.05
Anaconda	.15⅛	.13	.15½	.13	Isabella	.16⅜	.15⅝	.16⅜	.15
Cripple Creek Con.	.05⅞	.04⅝	.05	.04⅛	Jack Pot	.09	.08	.09	.08
C. K. & N.					Last Dollar	.50	.20	.50	.20
Doctor Jack Pot.	.08¼	.08⅜	.09	.08⅛	Mollie Gibson	.07	.05¼	.07	.05½
Elkton, Con.	.37¼	.36⅝	.37⅜	.36⅜	Moon Anchor	.09	.08	.09	.08
El Paso	.60	.58	.59½	.58	Pharmacist	.04½	.04¼	.04⅛	.04¼
Findley	.14⅜	.13½	.14½	.13½	Portland	1.40	1.30	1.36	1.33⅜
Gold Dollar Con	.05¼	.05	.05⅛	.05	Work	.06⅞	.06⅜	.07	.06¾

STOCK QUOTATIONS.

MEXICO*. April 3.

Name of Company	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango.				
Ca. Min. de Penoles	2,500	$50.00	$4,000	$4,500
San Andres de la Sierra	200	.....	1,000	.....
Guananjuato.				
Angustias, Pozos	2,400	5.00	85	90
Cinco Senores y An., aviadoras	2,000	15.00	200	205
Cinco Senores y An., aviada	400	10.00	185	195
Providencia, San Juan de la Luz	6,000	2.00	150	160
Queenslard y Australia	300	.....	90	100
Guerrero.				
Garduno y Anexas	7,200	.....	35	60
Hidalgo.				
Amistad y Concordia	9,600	5.30	74⅛	76
Carmen, aviada	1,100	.....	115	125
Guadalupe Fresnillo mill	1,000	.....	250	300
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora	1,536	.....	1,200	1,250
La Blanca, aviada	768	.....	900	915
La Reina y An., aviadora	5,600	.....	25	21
Maravillas y An., aviador	1,680	.....	.....	.....
Maravillas el Lobo	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	650	700
Santa Ana y An., aviadora	1,800	.....	30	35
Santa Ana y An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	.....	7⅛
Sta. Gertrudis y An., aviadora	28,800	1.00	80	81
Santo Tomas Apostol aviadoras	5,100	.....	1	2
San Felipe de Jesus, aviadora	3,600	.....	40	43
San Felipe de Jesus, aviada	1,200	.....	10	12
San Rafael y An., Trompillo	1,200	12.00	1,050	.....
San Rafael y An., aviada	1,200	$8.00	$400	$410
Soledad, aviada	960	5.00	340	360
Sorpresa, aviada	960	5.00	300	315
Mexico.				
Alacran	2,400	.....	30	40
Buen Despacho	3,000	.....	55	60
Dos Estrellas	3,000	30.00	2,200	2,220
La Esperanza (El Oro)	3,000	10.00	1,180	1,200
La Reformia, aviadores	2,000	.....	58	60
Santa Ana, Esperanza	2,400	.....	70	90
Michoacan.				
Luz de Borda, aviadora	3,000	.....	43	45
Luz de Borda, aviada	1,000	.....	10	14
San Luis Potosi.				
Concepcion y An.	3,000	.....	110	130
El Barreno, aviadora	2,000	2.00	50	53
Sta. Maria de la Paz	2,400	10.00	.....	.....
San Diego y Annexas	2,400	4.00	10	15
Zacatecas.				
Asturiana y An.	2,500	.....	50	70
Candelaria y Pinos	2,500	10.00	250	260
Esperanza y An.	2,400	.....	50	40
Lourdes	2,500	.....	20	30
Luz de Minillas, pagadoras	2,000	.....	25	30
San Carlos y Annexas	2,500	20.00	150	170
Sta. Maria de Gaud.	2,500	10.00	55	65
Miscellaneous.				
Bartolome de Medina	2,000	1.50	70	75
Guadalupe Hacienda	10,000	6.00	.....	.....
La Luz Hac. (Pachuca)	3,750	.....	300	305
La Reina (Chihuahua)	192	.....	.....	.....
Naica (Chihuahua)	100	.....	6,000	.....
Natividad (Oaxaca) aviadora	1,800	8.00	700	900
Natividad (Oaxaca) aviadas	600	4.00	700	900
San Francisco Hac.	6,000	1.00	52	55
Santa Ana Huantla Morelos	4,000	.....	.....	.....
Union Hacienda	3,000	5.00	240	260

*Values are in Mexican currency.

SAN FRANCISCO (*By Telegraph*).

Name of Company.	April. 13.	April. 14.	Name of Company.	April. 13.	April. 14.
Belcher	.53	.53	Justice	.13	.13
Best & Belcher	1.75	1.70	Mexican	1.25	1.15
Caledonia	2.20	2.30	Occidental Con.	.45	.45
Challenge Con.	.58	.56	Ophir	1.75	1.70
Chollar	.29	.28	Overman	.58	.57
Confidence	1.35	1.25	Potosi	.24	.27
Con. Cal. & Va.	1.50	1.55	Savage	.24	.25
Con. Imperial	.02	.02	Sierra Nevada	1.00	.96
Crown Point	.29	.27	Union Con.	1.10	1.05
Gould & Curry	.26	.44	Utah Con	.32	.35
Hale & Norcross	.63	.63	Yellow Jacket	.35	.34

SALT LAKE CITY.* Apr. 10.

Name of Company	Shares.	Par Val	High	Low	Sales.	Name of Company.	Shares.	Par Val	High	Low	Sales.
Ajax	.....	.....	.27	.26¾	1,300	La Reine	.....	.....	.05	.05	3,000
Ben Butler	.....	.....	.08¼	.08	8,500	May Day	.....	.....	.20¼	.18	37,500
California	300,000	$1	.15½	.14½	4,300	M. Washington	.....	.....	.03¾	.03⅜	12,000
Carisa	500,000	1	.17½	.16½	1,300	N. Y. Bonanza	.....	.....	.23⅜	.22	29,550
Century	150,000	1	.48	.46	1,800	Sacramento	1,000,000	5	.26¾	.25¾	30,750
Con. Mercur	1,000,000	5	1.51½	1.48	8,416	Silver Shield	.....	.....	.07	.07	1,000
Daly	.....	.....	2 30	2.30	100	Star Con	500,000	1	.15⅛	.12	6,000
Daly-Judge	300,000	1	10.05	9.90	1,275	Tetro	.....	.....	.16⅛	.16	1,300
Daly-West	180,000	20	43.30	42.75	1,885	Utah	.....	.....	.74½	.74	700
E. & B. Pencil	.....	.....	.79¼	.75	1,300	Valeo	.....	.....	.....	.....	.....
Grand Central	250,000	1	5 42½	5.25	700	Victor	500,000	1	.28¾	.27	7,800
Ingot	.....	.....	.04⅝	.04	5,000	Wabash	.....	.....	.31½	.28⅝	6,800
L. Mammoth	150,000	1	.48¼	.39¾	7,400	Yankee Con	500,000	1	.40	.35⅛	2,700

All mines are in Utah. *By our Special Correspondent. Total sales, 182,476 shares.

ST. LOUIS, MO.* Apr. 11.

Name.	Capital Stock.	Par Val.	Prices. Bid.	Prices. Ask.	Name.	Capital Stock.	Par Val.	Prices. Bid.	Prices. Ask.
Am. Nettie, Colo.	$3,000,000	$10	$0.50	$0.70	Columbia Lead, Mo.	$500,000	10	11.00	12.50
Catherine Lead, Mo.	500,000	10	1.80	3.00	Con. Coal, Ill.	500,000	100	21.00	23.00
Central Coal & C.	1,875,000	100	65.25	66.25	Doe Run Lead Co.	1,500,000	100	105.00	110.00
Central C. & C., pf.	1,875 000	100	73.50	75 00	Granite Bimet., Mt.	1,000,000	10	82.00	77.0
Central Lead, Mo.	1,000,000	10	130 00	140.00	St. Joe Lead, Mo.	6,000,000	10	16 00	17.0

*From our Special Correspondent.

PHILADELPHIA, PA.*

Name and Location of Company.	par val	Apr. 8. H.	Apr. 8. L.	Apr. 9. H.	Apr. 9. L.	Apr. 10. H.	Apr. 10. L.	Apr. 11. H.	Apr. 11. L.	Apr. . H.	Apr. . L.	Apr. 1 . H.	Apr. 1 . L.	Sales
Am. Alkali, Mich.	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement	10	.....	.....	.....	.....	.....	.....	.....	.....	7¾	.....	8	7¾	250
Cambria Iron, Pa.	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	.....	12
Cambria Steel, Pa.	50	24¾	24⅜	24¾	24⅜	.....	.....	.....	.....	24¼	23⅜	24	23½	5,978
Penn. Steel, pfd.	100	.....	.....	93	.....	.....	.....	.....	.....	94	.....	94	.....	60
Susq. I. & S., Pa.	5	.....	.....	.....	.....	.....	.....	.....	.....	2 1/16	.....	.....	.....	300
United Gas I., Pa.	50	107¾	106⅛	107⅛	106	.....	.....	.....	.....	106¼	105¾	107¾	105½	7,160
Warwick I. & Steel	10	.....	.....	5¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	50

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 13,800 shares.

LONDON. April 3.

Name and Country of Company	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date	Quotations. Buyers. £ s. d.	Quotations. Sellers. £ s. d.
Alaska-Treadwell, g., Alaska	200,000	5 0 0	1 6	Apr., 1903	4 7 6	4 12 6
Anaconda, c. s., Montana	1,200,000	5 0 0	2 0	Nov., 1902	5 13 9	5 16 3
Arizona, c., Def., ord	63,444	1 0 0	5 6	Feb., 1903	8 0 0	8 10 0
Arizona, pref., ord	316,350	1 0 0	5 6	Feb., 1903	8 0 0	8 5 0
Camp Bird, g., Colorado	738,000	1 0 0	0 7½	Mar., 1903	1 11 0	1 11 6
Copiapo, c., Chile	112,500	2 0 0	6 10⅓	Mar., 1903	2 5 0	2 10 0
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	11 3	13 9
Enterprise, g., British Col.	165,000	1 0 0	.....	.....	2 8	7 6
El Oro, g., Mexico	1,000,000	1 0 0	1 6	Dec., 1902	1 11 3	1 13 9
Frontino & Bolivia, g., Colombia	128,662	1 0 0	3 0	July, 1901	17 6	1 0 0
Le Roi, g., British Col.	200,000	5 0 0	5 0	Nov., 1899	1 8 9	1 11 3
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	May, 1902	18 9	1 1 3
Mesquital, Mexico	250,000	2 0	3	Feb., 1903	4 0	5 0
Montana, g. s., Montana	657,128	1 0 0	6	April, 1899	2 0	2 6
Mountain, c., Cal.	250,000	5 0 0	4 6	Nov., 1902	3 5 0	3 10 0
Stratton's Independence, Colorado	1,000,007	1 0 0	6	April, 1902	9 6	10 6
St. John del Rey., g., Brazil	546,265	1 0 0	6	Dec., 1902	16 6	17 6
Utah Con., g. c., (Highland Boy), Utah	300,000	1 0 0	7 0	Jan., 1903	5 10 0	6 0 0
Ymir, g., British Col.	200,000	1 0 0	1 0	Mar., 1902	7 6	10 0
European:						
Linares, l., Spain	15,000	3 0 0	9	Oct., 1902	3 15 0	4 5 0
Mason & Barry, c., sul., Port'g'l	185,172	1 0 0	13 0	May, 1902	3 17 6	4 2 6
Rio Tinto, c., Spain	325,000	5 0 0	27 6	Apr., 1903	50 5 0	50 10 0
Rio Tinto, pref., Spain	325,000	5 0 0	2 6	Apr., 1903	6 0 0	6 5 0
Tharsis, c., Spain	625,000	2 0 0	6 0	Apr., 1903	4 10 0	4 15 0
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	495,348	1 0 0	1 6	Jan., 1900	2 1 3	2 3 9
Briseis, Tin, Tasmania	600,000	1 0 0	.....	.....	8 0	9 0
Broken Hill Pr'p., s., N. S. Wales	960,000	8 0	1 0	Feb., 1903	1 13 9	1 15 0
Cosmopolitan Prop., W. Australia	385,000	1 0 0	6	July, 1902	14 6	15 0
Golden Horse Shoe, W. Australia	300,000	5 0 0	6 0	Apr., 1903	11 3 9	11 6 3
Great Fingall Con., W. Australia	250,000	1 0 0	5 0	Sept., 1902	7 16 3	7 18 9
Great Bo'd'r Pr'p., W. Australia	1,750,000	2 0	6	Mar., 1903	1 2 0	1 2 6
Ivanhoe Gold Corp. W. Australia	200,000	5 0 0	4 0	Jan., 1903	9 12 6	9 15 0
Kalgurli, g., W. Australia	120,000	1 0 0	2 6	Apr., 1903	4 6 3	4 8 9
Lake View Cons., g., W. Australia	250,000	1 0 0	rts.	Aug., 1902	2 16 3	2 18 9
Mt. Lyell M. & R. I., c., Tasmania	275,000	3 0 0	1 0	Apr., 1903	3 6 3	3 8 9
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Mar., 1903	4 0 0	4 5 0
Waihi, g., New Zealand	497,412	1 0 0	2 6	Mar., 1903	5 1 3	5 3 9
Indian:						
Champion Reef, g., Colar Fields	473,000	10 0	4 6	May., 1903	7 3 9	7 6 3
Mysore Gold, Colar Fields	530,000	10 0	5 0	Mar., 1903	7 1 3	7 3 9
Nundydroog, g., Colar Fields	484,000	10 0	1 6	Mar., 1903	2 5 0	2 7 6
Ooregum, g., Colar Fields	343,000	10 0	1 3	Dec., 1902	1 16 3	1 18 9
Ooregum, pref., g., Colar Fields	240,000	10 0	1 3	Dec., 1902	2 5 0	2 7 6
African:						
Angelo, g, Transvaal	600,000	1 0 0	6 0	Feb., 1903	7 3 9	7 6 3
Bonanza, g., Transvaal	200,000	1 0 0	12 0	Feb., 1903	5 0 0	5 5 0
British South Africa	4,436,019	1 0 0	rts.	May, 1899	3 3 4	3 4 4
Cape Copper, S. Africa	300,000	2 0 0	8 0	Jan., 1902	3 0 0	3 2 6
Cape Copper, pref., S. Africa	75,000	2 0 0	2 3	Jan., 1903	3 2 6	3 7 6
City and Sub'n (New), g., Transvaal	340,000	4 0 0	8 0	Aug., 1899	6 10 0	6 15 0
Crown Reef, g., Transvaal	120,000	1 0 0	11 0	May., 1903	17 10 0	18 0 0
De Beers Con., d., pref., Cape Colony	800,000	2 10 0	10 0	Mar., 1903	19 8 9	19 11 3
De Beers Con., def.	1,000,000	2 10 0	12 6	Mar., 1903	21 10 0	21 12 6
East Rand, Prop, Transvaal	970,000	1 0 0	rts.	May, 1902	8 5 0	8 7 6
Ferreira g., Transvaal	90,000	1 0 0	2 0	May, 1903	22 10 0	23 0 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	5 0	Feb., 1903	6 12 6	6 15 0
Geduld, g , Transvaal	400,000	1 0 0	rts.	Mar., 1902	8 1 3	8 3 9
Henry Nourse, g., Transvaal	125,000	1 0 0	8 0	Feb., 1903	9 5 0	9 10 0
Jagersfontein, d., Orange F. S.	200,000	5 0 0	6 0	Nov., 1899	27 5 0	27 10 0
Jubilee, g., Transvaal	50,000	1 0 0	bonus.	Aug., 1902	5 7 6	5 12 6
Jumpers, Transvaal	100,000	1 0 0	5 0	Aug., 1899	3 17 6	4 2 6
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept., 1899	4 3 9	4 6 3
May Con., g., Transvaal	288,750	1 0 0	3 0	Feb., 1903	4 10 0	4 12 6
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1903	5 10 0	5 15 0
Namaqua, c., Cape Colony	94,331	2 0 0	2 0	June, 1902	3 10 0	3 15 0
Primrose (New), g., Transvaal	325,000	1 0 0	2 0	Feb., 1903	3 18 9	4 0 0
Rand Mines, g., S. Africa	1,795,956	5 0	4 0	Aug., 1902	11 2 6	11 5 0
Robinson, g., Transvaal	750,000	5 0 0	6 0	Feb., 1903	10 15 0	11 0 0
Robinson Deep, g., Transvaal	460,000	1 0 0	5 0	May, 1899	5 6 3	5 8 9
Rose Deep, Transvaal	425,000	1 0 0	2 0	Feb. 1903	9 0 0	9 5 0
Salisbury, g., Transvaal	100,000	1 0 0	2 0	Mar., 1899	2 12 6	2 17 6
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1898	1 3 9	1 5 0
Village Main Reef, Transvaal	400,000	1 0 0	5 0	Oct., 1902	8 15 0	8 17 6
Wemmer, Transvaal	80,000	1 0 0	10 0	Jan., 1903	12 10 0	13 0 0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

LONDON. (*By Cable*).*

Name of Company.	Apr. 7. £. s. d.	Apr. 14. £. s. d.	Name of Company	Apr. 7. £. s. d.	Apr. 14. £. s. d.
Anaconda	5 15 0	5 10 0	Johannesburg Invest	3 7 6	3 6 3
British South Africa	3 5 0	3 3 9	Modderfontein	11 3 9	11 5 10¾
Camp Bird	1 11 0	1 15 0	Rand Mines	11 2 6	11 2 6
Con. Gold-Fields	7 15 0	7 17 6	Rio Tinto com	50 3 9	50 2 6
De Beers Con. def	21 11 3	21 13 9	Simmer & Jack	1 13 9	1 13 9
East Rand	8 7 6	8 6 9	Tomboy	2 0 0	2 0 0
El Oro, Mex	1 12 6	1 12 6	.....	.....	.....
Jagersfontein	26 17 6	28 2 6	.....	.....	.....

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. April 1.

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest dive. Fr.	Prices. Opening. Fr.	Prices. Closing Fr.
Boleo	Lower Cal.	Copper	.....	500	176.00	1,420.00	1,470.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	21.25	22.25
Fraser River	Brit. Col'mb.	Gold	250,000	25	.....	6.50	6.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	108.00	108.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	485.50	486.00
Nickel	N. Caled'nia	Nickel	15,000,000	250	22.50	470.00	460.00
Rebecca	Colo'do, U. S.	Gold	5,000,000	25	.....	0.75	0.75
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	655.00	680.00

TORONTO, ONT.* Apr. 11.

Name of Company.	par val	Prices. High.	Prices. Low.	Sales.	Name of Company	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.37½	.04½	.....	Granby Smelter	$10	500	480	.....
Cariboo (Mc. K.)	1	.16	.12	5,500	Mountain Lion	1	.15	.11	.....
Cariboo (Hyd.)	1	.75	.....	.....	North Star	1	.14	.11¾	.....
Center Star	1	.32	.28	.....	Nova Scotia Steel, com	100	.....	.....	.....
Crows Nest, C.	100	.....	.....	.....	Payne	1	.20	.18	.....
Dominion Coal, com.	100	.....	.....	.....	Rambler Cariboo	1	.35	.25	.....
Dominion S. & I.	100	.....	.....	.....	Republic	1	.07	.05	.....
Dominion S. & I., pref.	100	66¼	64	.....	St. Eugene	1	.45	.35	.....
Fairview	1	.05¾	.05	6,000	Virtue	1	.09	.07	.....
Giant	1	.03½	.02	.....	War Eagle Con	1	.16	.11	.....

*Standard Stock and Mining Exchange. Total sales ,500 shares

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F.FF.FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09½
Mont. car-lots, f.o.b., Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg.ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh.ton		25.00@35.00
Pumice Stone, Am. Powd	lb.		.01⅝@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04½
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.41@2.43
Refined wood 95@97%	"		.60@.65
Purified	"		1.20@1.50
ALUM—Lump	100 lbs.		1.65
Ground	"		1.70
Porous	"		.80
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.05½
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.05⅝
Lump	"		.09
Nitrate, white pure (99%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05¾@.07¼
Oxide, com'l white, 95%	"		.09½
Com'l white, 95%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.03@.03½
Red	"		.06½@.06¾
ASPHALTUM—			
Ventura, Cal.	sh.ton		32.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh.ton		25.00@27.50
92@98%	"		26.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100lbs.		1.67½@1.76
Chem. pure cryst	lb.		.05
Nitrate, powdered	"		.05⅛

	Cust.	Meas.	Price.
BARIUM			
Sulphate (Blanc Fixe)	lb.		$0.01⅞
BARYTES—			
Am. Crude, No. 1	sh.ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.75
Foreign, gray	"		14.00
Snow white	"		17.00
Floated	"		18.75
BAUXITE—Ga. or Ala. Mines:			
First Grade	lg.ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.03½
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE—Bulk.	"		.35
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh.ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		1.70@1.90
Foreign	"		1.65@2.25
"Rosendale," 300 lbs	"		.75
Slag cement, imported	"		1.65
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh.ton		3.25
Ppt. per quality	lb.		.04¼@.05¼
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE—			
(50% ch.) ex-ship N. Y.	lg.ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg.ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		17.00
Fire Clay, ordinary	sh.ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.26@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—in bulk	100 lbs.		.42½
In bbls	"		.47½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25 lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro, (32-2-10° Be.)	"		.13⅞@.14
FELDSPAR—Ground	sh.ton		8.00@9.00
FLINT PEBBLES—Dan. Best.	lg.ton		14.75
French, Best	"		11.75
FLUORSPAR—			
Am. lump, 1st grade	sh.ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH—	100 lbs.		.80

	Cust.	Meas.	Price.
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh.ton		$8.00
Pulverized	"		30.00
German, com. pulv.	lb.		.01¼@.01⅓
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03½
Best pulverized	"		.04@.08
Italian, pulv	"		.01¼
GYPSUM—Ground	sh.ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg.ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas color.	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran.	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.80
Finishing	"		.90
MAGNESITE—Greece.			
Crude (95%)	lg.ton		6.00@6.50
Calcined	sh.ton		17.50@18.00
Bricks	M		170.00
Am. Bricks, f.o.b. Pittsburg	"		175.00
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01⅝
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—Powdered, 70@75% binoxide	lb.		.01¼@.01½
Crude pow'd. 75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.18@.19
Domestic	"		.30
MARBLE—Flour	sh.ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse	sh.ton		33.00@38.00
Fine	lb.		.00⅞@.02
Sheets, N. C., 2x4 in.	"		.30
3x3 in.	"		.80
3x4 in.	"		1.50
4x4 in.	"		2.00
6x6 in.	"		3.00
MINERAL WOOL—			
Slag, ordinary	sh.ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.			
25@30, cold test	gal.		.11½@.12½
15, cold test	"		.12½@.12¾
Zero	"		.13½@.13¾
Summer	"		.11@.12
Cylinder, dark steam ref.	"		.10¼@.11¾
Dark, filtered	"		.15½@.17½
Light, filtered	"		.16½@.19
Extra cold test	"		.27½@.31½
Gasoline, 86°@90°	"		.16@.21
Naphtha, crude, 68°@72°	bbl.		11.20
"Stove"	gal.		.14½
Linseed, domestic raw	"		.42@.46
Boiled	"		.48
Calcutta, raw	"		.75
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.25
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05⅝@.05¾
English flake	"		.08¼@.08½
Glassmakers'	"		.07¾@.08½

	Cust.	Meas.	Price.
PAINTS AND COLORS—			
Metallic, brown	sh.ton		$19.00
Red	"		16.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01½@.01⅝
Orange mineral, Am.	"		.08½@.08⅝
Foreign, as to make	"		.08½@.10¼
Paris green, pure, bulk	"		.12
Red lead, American	"		.06¼@.06½
Foreign	"		.06⅝@.07¼
Turpentine, spirits	gal.		.57½@.58
White lead, Am., dry	lb.		.05½@.05¾
American, in oil	"		.06⅝@.06¾
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex dry	"		.04⅝@.04¾
Foreign, red seal, dry	"		.06@.06¼
Green seal, dry	"		.06½@.06¾
POTASH			
Caustic, ordinary	"		.04½@.04⅝
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am.	"		.08½@.08¾
Scotch	"		.08½@.09
Bromide, bulk	"		.22
Carbonate (80@85%)	"		.03½@.04
Chlorate, f.o.b. works	"		.07@.07½
Foreign, f.o.b. N. Y.	"		.07½@.07¾
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg.ton		9.30
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95%	"		1.86
Permanganate	lb.		.09¼@.10
Prussiate, yellow	"		.13¼@.13½
Red	"		.34
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh.ton		4.40
SALTPETRE—Crude	100 lbs.		3.35@3.40
Refined	"		4.25@4.62½
SILICA—Best foreign	lg.ton		10.00@11.00
Ground quartz, ord.	sh.ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.31½
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ordinary, f.o.b. w'ks	100 lbs.		1.25
Bichromate	"		1.60
Foreign, f.o.b. N. Y.	"		3.50
Extra domes. f.o.b. w'ks	lb.		.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.		.72½@.75
Foreign, f.o.b. N. Y.	"		.90@.92½
Caustic, 60@78%, f.o.b. w'ks	"		1.65@1.70
Foreign, f.o.b. N. Y.	"		1.90@2.00
Chlorate, com'l	"		.07¼@.07¾
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.05
Shipments	"		1.87½@1.90
Peroxide	lb.		.45
Phosphate	"		.02⅜@.02¼
Prussiate	"		.09½
Sal soda, f.o.b. works	100 lbs.		.55
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	"		.05
Com'l	"		.01
Sulphate, com'l	100 lbs.		82½
Sulphide	lb.		.01¼
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh.ton		18.00
N. Y., Fibrous, best	"		10.20
French, best	100 lbs.		1.25
Italian, best	"		1.62½
TAR—Regular	bbl.		2.40
Oil barrels	"		4.40
TIN—Crystals	lb.		.22
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09
Carbonate, ppt.	"		.09
Chloride solution, com'l	"		.02¼
Chloride granular	"		.04¼@.04⅝
Dust	"		.04⅝@.04¾
Sulphate	"		.02½@.02⅝

THE RARE EARTHS.

BORON—Nitrate	lb.		$1.75
CALCIUM—Tungstate (Scheelite)	"		.90
CERIUM—Nitrate	"		10.00
DIDYMIUM—Nitrate	"		35.00
ERBIUM—Nitrate	"		40.00
GLUCINUM—Nitrate	"		20.00
LANTHANUM—Nitrate	"		30.00
LITHIUM—Carbonate	"		1.25
LITHIUM—Nitrate	oz.		.60
STRONTIUM—Nitrate	lb.		.07⅝@.08
THORIUM—Nitrate 49@50%	"		4.50
URANIUM—Nitrate	oz.		.25
YTTRIUM—Nitrate	lb.		40.00
ZIRCONIUM—Nitrate	"		8.00

Note.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the Engineering and Mining Journal are requested to report any corrections needed, or to suggest additions which they may consider advisable.